OFGEM

GAS DISTRIBUTION PRICE CONTROL REVIEW

FIVE YEAR CONTROL

(CAPEX/REPEX)

REPORT 2

NORTHERN NETWORK

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1 EXECUTIVE SUMMARY

1.1 CAPEX

PB Power has reviewed the submission by Northern Gas Networks (NGN) for the Capex allowances for the Northern (No) network for the period 2008/09 to 2012/13, and sets out in this report its proposed cost projections, and the reason for any changes to the Northern submission.

Capex costs are the total (net) costs of:

- LTS & Storage Capex
- Connections Capex
- Mains and Governors Capex
- Other Operational Capex
- Non-operational Capex

For each activity, we have, where possible, identified the benchmark activity costs by examining the unit costs in the base year (2005/06). Setting the level of the benchmark unit costs has also been informed by NGN's forecast costs for 2006/07. When the actual operating costs for 2006/07 are known, we will review our proposals and make adjustments if appropriate.

This report makes proposals for NGN's Capex allowances for the next price control period (2008/09 to 2012/13). In this report we have made adjustments to bring the Network's forecast expenditure towards the frontier. Our proposals and NGN's normalised submission are summarised in the following table and chart.

Northern Network Capex Submission v Proposed

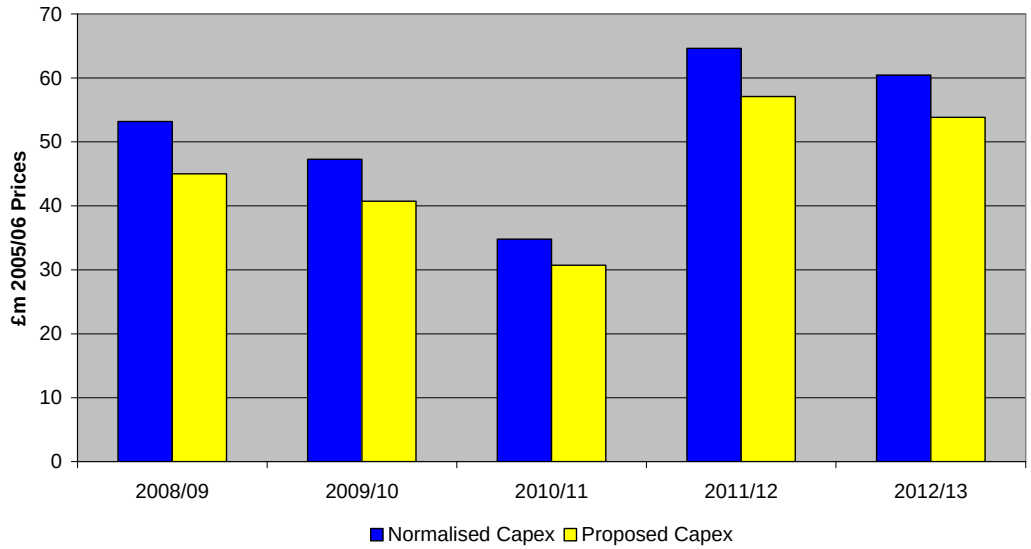

Figure ***1-1***

Northern Network Net Capex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission						
LTS & Storage Capital Expenditure	4.1	8.8	3.0	29.0	30.3	**75.2**
Connections	9.0	9.2	9.5	9.5	9.7	**47.0**
Mains Reinforcement	4.8	4.8	5.0	5.0	5.1	**24.7**
Governors	1.6	1.8	1.8	1.9	1.8	**8.9**
Other Operational	7.6	5.3	4.8	4.8	4.3	**26.9**
Non Operational	24.5	17.3	8.8	12.9	9.1	**72.5**
Total	**51.5**	**47.2**	**32.9**	**63.2**	**60.4**	**255.2**
Normalisation Adjustments						
Other Operational	-0.2	-0.1	-0.1	-0.1	-0.1	**-0.6**
Non Operational	1.9	0.1	2.0	1.6	0.1	**5.7**
Total	**1.7**	**0.0**	**1.9**	**1.5**	**0.0**	**5.1**
Normalised Capex	0.0	0.0	0.0	0.0	0.0	0.0
LTS & Storage Capital Expenditure	4.1	8.8	3.0	29.0	30.3	**75.2**
Connections	9.0	9.2	9.5	9.5	9.7	**47.0**
Mains Reinforcement	4.8	4.8	5.0	5.0	5.1	**24.7**
Governors	1.6	1.8	1.8	1.9	1.8	**8.9**
Other Operational	7.4	5.2	4.7	4.7	4.2	**26.3**
Non Operational	26.3	17.5	10.8	14.5	9.3	**78.3**
Total	**53.2**	**47.3**	**34.8**	**64.6**	**60.4**	**260.3**
Adjustments						
LTS & Storage Capital Expenditure	-0.2	-0.5	-0.4	-4.2	-2.0	**-7.2**
Connections	-2.2	-2.4	-2.7	-2.7	-2.9	**-12.8**
Mains Reinforcement	0.1	0.0	-0.3	-0.3	-0.5	**-1.0**
Governors	0.0	0.0	-0.1	-0.1	-0.1	**-0.3**
Other Operational	-0.7	-0.9	-1.0	-1.1	-1.1	**-5.0**
Non Operational	-5.2	-2.7	0.3	0.8	0.0	**-6.8**
Total	**-8.2**	**-6.6**	**-4.1**	**-7.5**	**-6.6**	**-32.9**
Proposed Capex						
LTS & Storage Capital Expenditure	3.9	8.3	2.6	24.9	28.3	**68.0**
Connections	6.8	6.8	6.8	6.9	6.9	**34.2**
Mains Reinforcement	4.9	4.8	4.7	4.7	4.6	**23.7**
Governors	1.5	1.7	1.8	1.8	1.7	**8.6**
Other Operational	6.7	4.3	3.6	3.6	3.1	**21.3**
Non Operational	21.2	14.7	11.1	15.2	9.3	**71.5**
Total	**45.0**	**40.7**	**30.7**	**57.1**	**53.8**	**227.4**

Table 1-1

1.2 REPEX

PB Power has similarly reviewed the submission by NGN for replacement expenditure for the period 2008/09 to 2012/13.

Repex costs are the total (net) costs of:

- Replacement Mains
- Replacement Services
- Replacement LTS Pipelines

Our approach to replacement expenditure has been similar to Capex and our proposals and NGN's submission are summarised in the following table and chart.

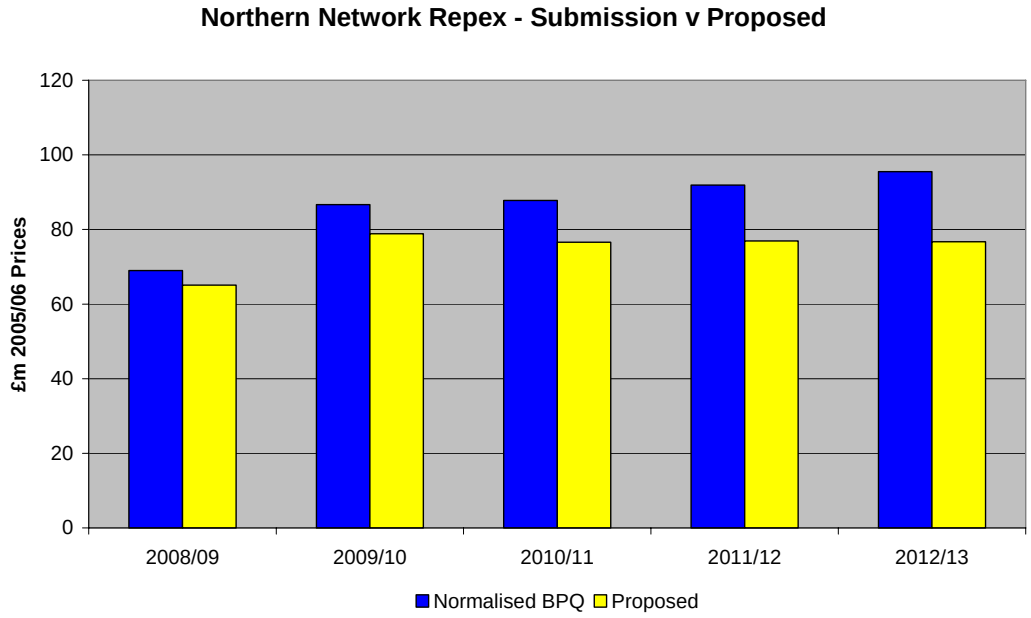

Figure ***1-2***

Northern Network Net Repex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission						
Mains	46.2	48.9	51.2	52.7	54.4	**253.4**
Services	25.0	25.4	25.6	26.0	26.4	**128.3**
LTS	6.5	27.5	1.5	0.9	0.9	**37.1**
Total	**77.7**	**101.8**	**78.3**	**79.5**	**81.7**	**418.9**
Normalisation Adjustments						
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Normalised BPQ						
Mains	46.2	48.9	51.2	52.7	54.4	**253.4**
Services	25.0	25.4	25.6	26.0	26.4	**128.3**
LTS	6.5	27.5	1.5	0.9	0.9	**37.1**
Total	**77.7**	**101.8**	**78.3**	**79.5**	**81.7**	**418.9**
Adjustments						
Mains	-1.6	-3.1	-4.7	-6.4	-7.9	**-23.7**
Services	-0.1	-0.8	-1.2	-1.8	-2.4	**-6.2**
LTS	-0.2	-1.1	-0.1	-0.1	-0.1	**-1.4**
Total	**-1.9**	**-4.9**	**-6.0**	**-8.2**	**-10.3**	**-31.3**
Proposed						
Mains	44.6	45.9	46.5	46.3	46.5	**229.8**
Services	24.9	24.6	24.4	24.2	24.0	**122.2**
LTS	6.3	26.4	1.4	0.8	0.8	**35.7**
Total	**75.7**	**96.9**	**72.3**	**71.4**	**71.4**	**387.6**

Table 1-2

2 INTRODUCTION

2.1 PRICE CONTROL REVIEW TIMETABLE

The final proposals for the one-year price control have been accepted by the GDNs. Ofgem is now carrying out a further review to set price control allowances for 1 April 2008 to 31 March 2013. The full process is shown in the following diagram.

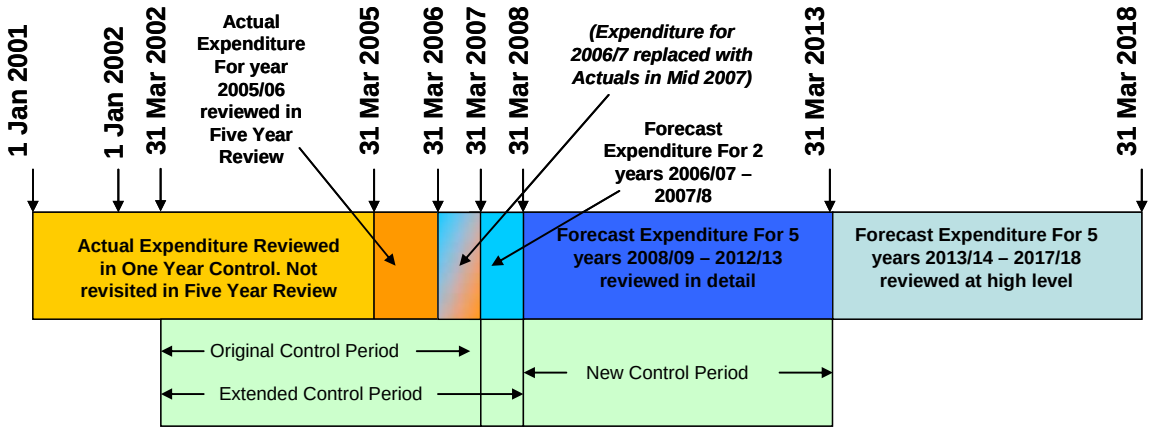

Figure 2-1

2.2 FIVE YEAR CONTROL

Ofgem appointed PB Power working in partnership with Rune Associates Limited to assist them in the preparation of the Capex and Repex elements of the Business Plan Questionnaires (BPQs). Subsequently Ofgem extended this work to include the analysis of the Capex, Repex and Direct Opex submissions by the GDNs.

Our findings on the Capex and Repex submissions are contained in this report, whilst the Direct Opex findings are the subject of a separate report.

The questionnaires were issued on 30 June 2006. These were returned to Ofgem between 6 and 13 October 2006. Additionally a series of cost visits were held with the GDNs between 10 November and 1 December 2006. Our findings have been drawn from the BPQs, cost visits and responses to supplementary questions sent to the GDNs.

2.3 BUSINESS PLAN QUESTIONNAIRE

A combined BPQ was issued on 30 June. This covered the Financial Statements, Opex, Capex and Repex requests. The Capex and Repex areas covered by this report were covered by 20 Excel worksheets, guidance to the GDNs as to how to complete the worksheets and additional narrative questions.

GDNs were asked to respond to Ofgem by 6 October 2006 and to upload all the data onto PB Power's file management system, PBShare. All parties in the process were granted appropriate access to relevant folders and documents. Some documents had to be provided in paper copy and these were sent both to PB Power and to Ofgem.

As the analysis of the submissions progressed and where the return was either unclear or insufficient it became necessary to ask the GDNs for additional information. These supplementary questions and the additional information which was presented in reply, were logged and stored on PBShare.

At the end of the process the worksheets were updated to include all amendments submitted and should be read in conjunction with this report.

2.4 PURPOSE

The purpose of the report is for PB Power to provide recommendations to Ofgem on the efficient levels of expenditure required by NGN to carry out their activities in the Northern Network. Ofgem will consider these recommendations together with other information in proposing appropriate expenditure allowances for 2008/09 to 2012/13.

2.5 ANALYSIS AND REPORTING PROCESS

The BPQ was designed to collect all the data required for analysis.

PB Power has structured this report into the following workstrands:

i) Capex: for Local Transmission System (LTS) and Storage: for all work on the network from 85 bar down to 7 bar, including HP and LP storage.

ii) Capex: for connections works on the below 7 bar network.

iii) Capex: for mains reinforcement and governor works on the below 7 bar network.

iv) Capex: for other operational items including Plant & Equipment and Land & Buildings.

v) Capex: for non-operational items including I.T. and System Operation work.

vi) Repex: for all replacement work below 7 bar including the Policy Mains Replacement Programme.

vii) Repex: for all LTS replacement work above 7 bar

2.5.1 COST NORMALISATION

A key requirement for robust analysis is that GDN costs for particular Capex/Repex activities should be allocated on a consistent basis. Following detailed analysis of the BPQ returns, a number of adjustments have been made to achieve this objective. These adjustments include applying the results of the work on accounting adjustments carried out by Ofgem. The process restates the GDNs' BPQ submissions on this "normalised" basis.

2.5.2 COST ASSESSMENT PROCESS

The expenditure projections for the efficient level of expenditure required by the GDN have been carried out in a number of different ways depending on the activity and quality of information available for this review.

Principally two main techniques have been used:

- comparative benchmarking between GDNs where workload is sufficiently well defined to obtain reliable regression analysis, and
- a bespoke review by our consultants to form a judgement on the appropriate expenditure projections based on the information provided.

With both methods full analysis of the information presented in the context of the requirements of a Gas Distribution business has been carried out to support the findings.

The process of developing our expenditure proposals has the following steps:

- Cost normalisation,
- Establishing base year for cost analysis,
- Benchmarking costs derived from the base year costs,
- Workload projections for the period 2005/06 to 20012/13,
- Cost projections,
- Gap adjustment.

2.5.3 ESTABLISH BASE YEAR

A base year was chosen in order to carry out the comparative regression analysis. The preferred year was 2005/06, where the availability of actual outturn values removed any element of variation due to GDN forecast values. However, for some activities the year 2006/07 has been used due to variations in the 2005/06 data. Generally it has been found that the year 2004/05 contains too many inconsistencies in data reporting, mainly due to the network sales process, and is not suitable as a base year for comparative analysis.

2.5.4 BENCHMARK COST ANALYSIS PROCESS

We have determined benchmark costs in the manner most appropriate to the data and the activity.

Some costs were best assessed on an individual basis. For example, lift and shift pipeline costs are contract specific.

These costs were removed before determination of the benchmark costs of an activity, and were assessed separately. If appropriate an allowance for such costs were added back after the assessment of the costs for the activities which are common across GDNs.

Where possible we used comparative analysis to determine benchmark activity costs. In general we have used the following type of cost function which is common in the regulatory literature:

$$Cost = K\, w^{a} \qquad (1)$$

where K and a are constants.

Where there are economies of scale associated with an activity, a<1, so that the unit cost of an activity for a larger network will be less than for a smaller network. For each activity we have used our knowledge and experience to explore different cost drivers and select the most appropriate workload driver (w) for the activity concerned.

By taking the natural log of equation (1) we can derive the following equation:

$$\ln(Cost) = \ln(K) + a \ln(w) \qquad (2)$$

This equation is used to carry out the regression analysis and estimate each of the parameters of the cost function.

2.5.4.1 Assessment of regression outcome

When we have carried out regression analysis we have assessed the fit of the regression line to the data points by calculating the r^2 value and by carrying out hypothesis testing where the r^2 values are not directly comparable.

The value of r^2 is one indicator of goodness of fit. It is the proportion of the variance in the cost data that is explained by the variance in the cost data derived from the Ordinary Least Squares (OLS) regression.

We have used appropriate tests to determine whether the linear or the logarithmic linear regression gives the better fit to the data and have used the regression with the better fit. Where there is no significant difference in fit the logarithmic linear regression has been used.

For all the regression relationships used in this report $r^2>0.7$. Unit cost and/or bottom-up analysis has been used in all other cases.

The values of r^2 have the following significance:

- It is possible that the data points could show a relationship between the reported costs and the explanatory variable by chance. Analysis of variance identifies the component of the cost variable which is explained by the regression and the component unexplained by the regression. This gives a value for the F statistic and taking into account the number of data points, this can be used to test whether the explanation provided by the regression is better than is likely to have arisen by chance. With 8 (GDN) data points the test value for the F statistic is 5.99 and the corresponding value for r^2 is 0.5. If r^2>0.5 we can reject the hypothesis that the relationship arose by chance at the 5% significance level. If r^2>0.7 we can further reject the hypothesis at the 1% significance level

In order to test for the robustness of the regression results and in particular of the slope of the regression line, we have tested each regression result for heteroscedasticity (that is for a relationship between the variance in the disturbance term and the magnitude of the explanatory variable). This is important since evidence of heteroscedasticity could indicate a mis-specification in the regression model. The regression results presented in this report do not show such evidence at a significant level.

Although we have carried out detailed work to seek to ensure that the costs used in the regression analysis have been allocated to activities on a consistent basis across all GDNs, we recognise that that some different allocations may remain and that the use of regression to determine benchmark costs could potentially lead to an inadequate level of total Capex/Repex for a particular GDN. We have addressed this possibility by selecting the upper quartile value, rather than the lowest value as the benchmark cost, with any remaining effects mitigated by the gap closure process.

2.5.4.2 Two or more workload drivers

In all cases activity costs are driven by a number of different workload types. We have therefore constructed a composite scale variable (CSV) which includes the different drivers scaled by the proportion of costs attributable to each type of workload.

Logarithmic linear regression has been used to determine the relationship between costs and the CSV in this report.

2.5.4.3 Regression Values

Further details of the regression calculations and numbers are given in Appendix 8.

2.5.5 WORKLOAD PROJECTONS

The above approach has allowed the analysis to fully reflect the workload forecast by the GDNs, adjusted as deemed appropriate by our consultants. It has also minimised any inconsistent allocation of costs between activities, which is suspected in a number of areas.

The PB Power workload projections for the activity are determined for the period 2005/06 to 2012/13 from the activity analysis.

2.5.6 COST PROJECTIONS

This benchmark performance applied to our workload projections has then been used as the target which all under performing GDNs should move towards.

The following shows the performance measures used in assessing the Capex/Repex proposals.

Performance Measures Used in Determining The Opex Proposals	
Benchmark Performance	The Upper Quartile performance as determined from the regression analysis tracked forward from the base year to 2012/13 taking account of PB Power's expected productivity improvements. When showing this trend in the charts, along side our proposals, it is also adjusted for PB Power's assumptions for real price effects.
Baseline Performance	The GDNs BPQ reported performance in the base year tracked forward to 2012/13 taking account of PB Power's expected productivity improvements. When showing this trend in the charts, along side our proposals, it is also adjusted for PB Power's assumptions for real price effects.

Table 2-1

The benchmark costs against workload are shown in pink on the graphs. This is the target which all under performing GDNs should move towards

In the logarithmic linear regressions the pink line is parallel to the regression line.

In our approach annual productivity improvements are applied to total costs. This gives the end (2012/13) target cost line, shown in yellow on the graphs. This represents the expected position of the benchmark 2012/13 costs after allowing for the productivity improvements we expect to apply to a frontier efficient company.

2.5.7 GAP ADJUSTMENT

In order to form a view of the speed at which the GDNs should be expected to move towards this target performance, extrapolation of the base year performance has also been carried out for the whole period using our standard assumptions for any price rises which are expected to be in excess of the Retail Prices Index (RPI). Section 2.7 provides more details on real price effects.

A gap adjustment has been included where appropriate to provide a smooth transition from the BPQ level of costs at the PB Power workload levels to the benchmark performance by 2012/13. The gap adjustment will allow the GDN a period to review and amend their work arrangements to achieve the proposed benchmark efficient cost levels.

2.5.8 SUMMARY CHART

The overall process for deriving our recommended expenditure projections is shown in the flow chart below.

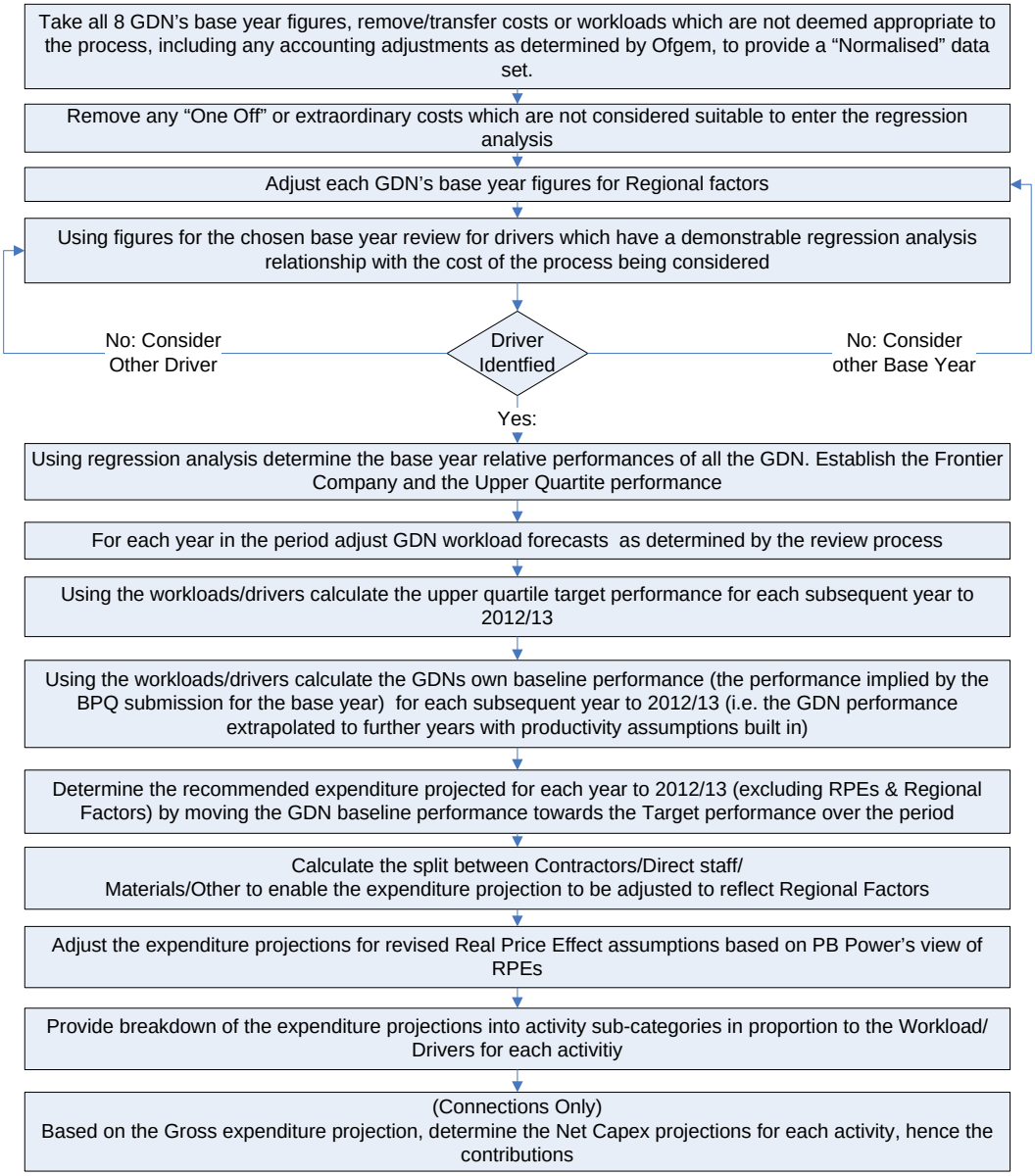

Figure 2-2

2.5.9 CONSULTANT ANALYSIS

Where analysis has shown that the workload is small, irregular or unit costs are volatile the regression techniques are not considered robust. For these activities a process has been used whereby the BPQ costs have been "Normalised" as outlined in section 2.5.1 above, and have then been restated taking account of regional factors and removing real price assumptions which have been declared by the GDN. This provides our consultants with an objective presentation of the costs and workloads for them to review and make appropriate recommendations regarding adjustments. The process is outlined in Figure 2-3

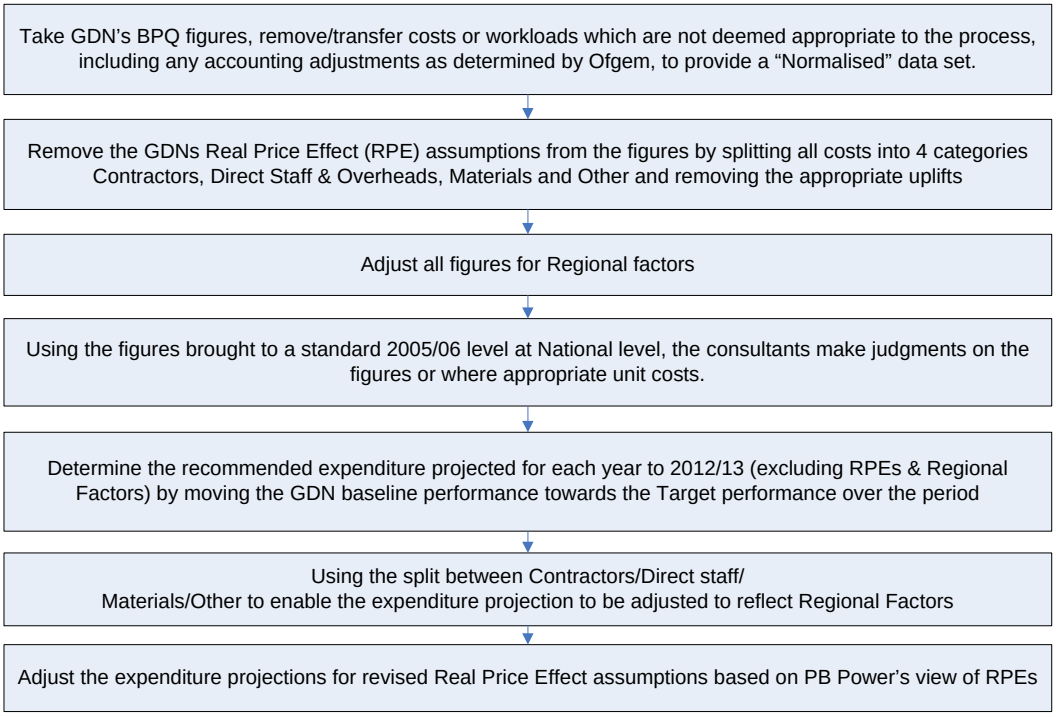

Figure 2-3

Once the adjustments have been assessed the process then reapplies the regional factors and our standard assumptions for RPEs, thus delivering our recommended projections for the activity.

2.6 COSTS

All costs in the report are in 2005/06 prices unless otherwise stated.

The table below shows the factors which have been used to convert pre 2005/06 costs to 2005/06. These factors have been used throughout the analysis.

Convert to	Convert from: 2000	2001	Q1 2002	2002/03	2003/04	2004/05	2005/06
Index	170.25	173.35	173.87	177.52	182.48	188.15	193.11
2000	1.00	0.98	0.98	0.96	0.93	0.90	0.88
2001	1.02	1.00	1.00	0.98	0.95	0.92	0.90
Q1 2002	1.02	1.00	1.00	0.98	0.95	0.92	0.90
2002/03	1.04	1.02	1.02	1.00	0.97	0.94	0.92
2003/04	1.07	1.05	1.05	1.03	1.00	0.97	0.94
2004/05	1.11	1.09	1.08	1.06	1.03	1.00	0.97
2005/06	1.13	1.11	1.11	1.09	1.06	1.03	1.00

Table 2-2

2.7 REAL PRICE EFFECTS

The submissions have been made on the basis of 2005/06 prices and RPEs have also been identified. In addition to the increases from the Retail Prices Index (RPI) assumed at an annual rate of 2.5%, other costs have been assessed as potentially rising faster than this rate. These additional increases used in this report have been summarised in Table 2-3 and are discussed further in the sections below. The assumptions used by NGN for RPEs are given in Appendix 8.

We have made adjustments to the submissions for all areas of the BPQ excluding Non-Operational Capex as we consider most of this expenditure is project based which will have been made on the basis of the best available planned processes at the time of the submissions. We consider it more appropriate to consider adjustments to this type of expenditure on a case by case basis.

Real Price Effects		2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Contractor Rates Year on Year	2.25%	100.0	102.3	104.6	106.9	109.3	111.8	114.3	116.9
Materials year on Year	1.00%	100.0	101.0	102.0	103.0	104.1	105.1	106.2	107.2
Direct Labour	1.00%	100.0	101.0	102.0	103.0	104.1	105.1	106.2	107.2

Table 2-3

2.7.1 CONTRACTOR PRICES

Contractor prices have a major impact on the costs of the GDN operations particularly in the areas of connections, mains replacement works and LTS projects. All GDNs have forecast that contractor prices will increase at a greater rate than the RPI. They have quoted particularly the Price Adjustment Formulae for Construction Contracts Indices published by the DTI (commonly known as the Baxter Indices) as evidence of the historical rate of real price inflation for these contracts. These trends have been set out in Figure 2-4 below.

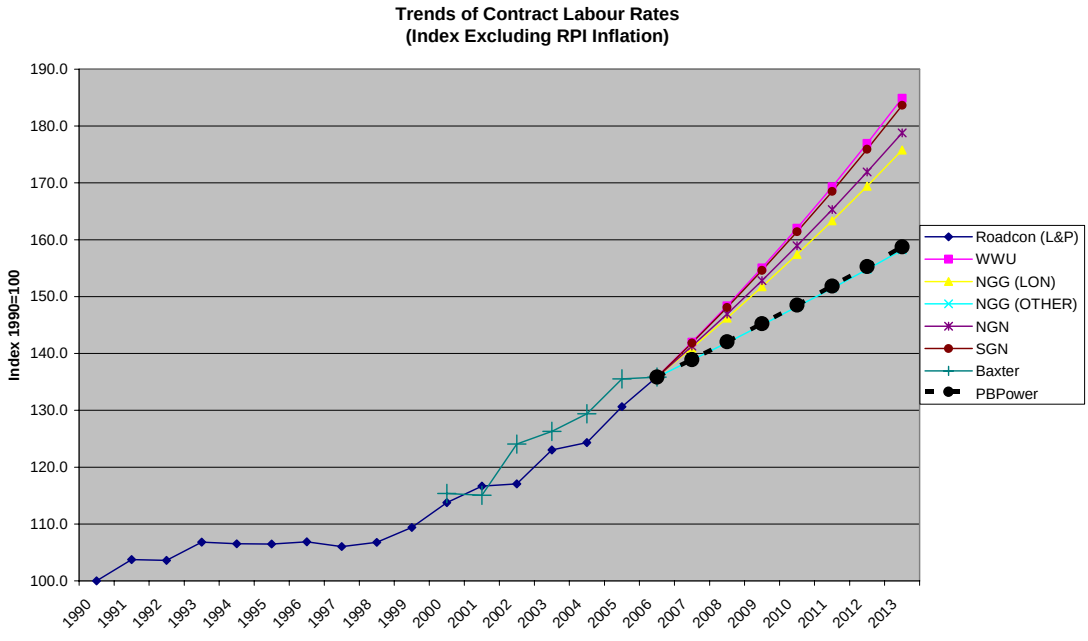

Figure 2-4

We have investigated these trends looking for comparisons for the gas distribution costs. These indices do not uniformly increase month by month as there tend to be step changes each year as contracts are re-negotiated. Examination of the most recent trends suggests that the high increases experienced a year ago have flattened out.

We have also compared the data with the Public Sector Construction Works Indices (Road Construction) published by the DTI. Whilst this sector is not directly reflective of gas distribution activities it is useful as a comparator to the Baxter Indices. As can be seen from Figure 2-4, whilst the two indices show small differences year on year the trends demonstrate very similar increase.

Having considered all of the previous trend information we have concluded that a projection of 2.25% is appropriate which is also shown in Figure 2-4.

Our analysis assumes a single rate of Contractor price increases across all GDNs with no differences between regions of the UK for the rate of increase.

2.7.2 DIRECT LABOUR COSTS

All GDNs have submitted the view that direct labour costs will continue to increase at a greater rate than the RPI.

Forecasting future wage and salary trends in relation to inflation is a matter of speculating on the outcome of future negotiations and many complex factors. Government's concern is with the control of inflation and as such encourages settlements at or below inflation.

The best evidence for future trends comes from recent experience. The DTI Employment Relations Research Series document No 56 dated March 2006 indicates that in the past decade, UK employees have enjoyed strong real (inflation adjusted) wages growth of 2.75% per year in the private sector. Public sector employees saw a slightly lower annual growth rate of around 2.25% to 2.5% in real earnings. This period spanned the introduction of the minimum wage and it appears that more recent real growth has slowed. The most recent Annual Survey of Hours and Earnings (ASHE) in April 2006 indicated that median gross weekly earnings were 4.1% in 2005. During this period inflation averaged 3%. Continuing this trend, the Ernst & Young ITEM Club indicated recently that average earnings increased annually by 4.1% in the year to November, despite a tightening labour market.

Based on recent evidence, a real price effect forecast of 1% for direct staff costs has been used in our analysis.

2.7.3 MATERIAL COSTS

All GDNs have submitted the view that material costs will continue to increase at a greater rate than the RPI. Having reviewed these rates we believe a reasonable rate of increase above RPI will be 1%. We conclude that this figure should be taken together with the productivity savings assumed which balance the effect of these increases.

2.7.4 OTHER COSTS

No specific evidence has been provided on real price rises for other costs and therefore our analysis has assumed no increases above RPI.

2.8 REGIONAL FACTORS

2.8.1 CONTRACTOR PRICES

We have based our initial views on the Quarterly Review of Building Prices as published by the Building Construction Information Service (BCIS) of the Royal Institution of Chartered Surveyors (RICS). This document provides a complete regional index of construction costs for the UK. For the purposes of our analysis we have rebased the October 2006 indices with Northern Ireland, Jersey and the Scottish Highlands excluded.

We have estimated the percentage for each county falling into each GDN, thus being able to derive an index of construction costs for each GDN. The table below sets out the values used for the analysis, the same factors have been used for each year. Details of the assumptions used to determine these factors are given in Appendix 7.

Regional Factors	WW	No	Sc	So	EoE	Lon	NW	WM
Regional Factors (Contractor Prices)	0.96	1.01	0.99	1.06	1.00	1.11	0.93	0.94

Table 2-4

2.8.2 DIRECT LABOUR COSTS

The Annual Survey of Hours and Earnings (ASHE) published by the DTI shows that there is a substantial London effect on average earnings. This shows that London wages are on average 30% higher than the national average.

Using this figure for London only, an assessment has been made as to how this impacts the GDNs. We concluded that only Southern and London GDNs are affected and that they are not fully exposed to the 30% uplift as the whole of the GDN is not within London and many activities are carried out away from the London location.

Our conclusions are set out in Table 2-5.

Regional Factors	WW	No	Sc	So	EoE	Lon	NW	WM
Regional Factors (Direct Labour)	0.98	0.98	0.98	1.03	0.98	1.10	0.98	0.98

Table 2-5

2.8.3 MATERIAL COSTS

No specific evidence has been provided of a regional impact on material prices and therefore our analysis has used any regional factors for material costs.

2.8.4 OTHER COSTS

No specific evidence has been provided of a regional impact on material prices and therefore our analysis has used any regional factors for other costs.

2.9 PRODUCTIVITY

Although we have not undertaken a full study of past productivity we have examined published information to determine an assumed base annual increase in productivity. We understand other consultants are undertaking broader economic studies of the operation of the GDN businesses.

Looking at the productivity information published by National Statistics on output per worker the average annual increase over the last 10-40 years is in the range 1.7% - 2.0%. In addition a report on the OFWAT web site compiled by Stone & Webster Consultants Limited in 2004 concluded “Broadly, the average rate of Opex productivity growth for [Water and Sewage Companies] has been in the range 1.7-1.9% per annum over the [period 1992-93 to 2002/03]”. In the light of these figures we have made a conservative assumption of 1% base annual increase. We have then used our engineering experience and judgement when reviewing the business plans of the companies to determine where we believe there is scope for additional productivity above this base rate.

The table below lists the areas in which our analysis has used an assumption for productivity to automatically generate our proposals over the period. The table also shows where we believe there is scope for productivity improvements, higher scope being identified by more ticks.

In other areas of analysis we have used the GDN's own forecasts modified as appropriate for specific issues.

Activities	Rate	Potential Opportunities (Above base Productivity)					
		New Techniques	Labour Productivity	Clerical Support Costs	Process Improvements	Contractual Reductions	IS Improvements
Opex – Work Management	1%						√√√
Opex – Remaining	1%						
Capex - Connections	3%	√	√√	√√√	√√√	√√	√√
Capex – Mains Reinforcement	2%	√√	√	√	√	√√√	√
Repex - All	1.75%	√	√	√	√	√√	√

Table 2-6

Our productivity assumptions are extrapolated to subsequent years based on the regression carried out on the information provided in the regression base year. We recommend that following the update of 2006/07 outturn figures, our assumptions are reviewed in the light of potential performance improvements already achieved during the 2006/07 financial year.

2.10 OUTER MET AREA

A geographical area on the boundary of the East of England Network and the London Network, the Outer Met Area, is for regulatory and income accounting purposes part of the East of England Network. However, the area is managed by NGG as part of the London Network.

In the review of Capex all comparative analysis has been carried out on the basis that the costs and work for the Outer Met Area have been included within the London figures. The BPQ has been completed by NGG on this basis

In the review of Repex all comparative analysis has been carried out on the basis that the costs and work for the Outer Met Area have been included within the East of England figures. The BPQ has been completed by NGG on this basis

The operating costs, assets and liabilities are deemed to be 9% of the transportation business operating costs, assets and liabilities of the London Network. We recommend that future returns and analysis is carried out on the basis that all aspects of the Outer Met Area is reported and analysed as being part of East of England Network.

3 LTS AND STORAGE CAPEX

3.1 SUMMARY

Net Capex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission						
Pipelines	2.4	0.6	1.3	22.9	29.0	**56.3**
NTS Offtakes	0.2	1.2	0.7	2.5	0.3	**5.0**
PRSs	1.5	7.0	1.0	3.6	1.0	**14.0**
Other storage	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**4.1**	**8.8**	**3.0**	**29.0**	**30.3**	**75.2**
Normalisation Adjustments						
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Normalised BPQ						
Pipelines	2.4	0.6	1.3	22.9	29.0	**56.3**
NTS Offtakes	0.2	1.2	0.7	2.5	0.3	**5.0**
PRSs	1.5	7.0	1.0	3.6	1.0	**14.0**
Other storage	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**4.1**	**8.8**	**3.0**	**29.0**	**30.3**	**75.2**
Adjustments						
Pipelines	-0.1	-0.1	-0.3	-3.7	-1.9	**-6.1**
NTS Offtakes	0.0	-0.1	0.0	-0.2	0.0	**-0.3**
PRSs	-0.1	-0.3	-0.1	-0.3	-0.1	**-0.8**
Other storage	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**-0.2**	**-0.5**	**-0.4**	**-4.2**	**-2.0**	**-7.2**
Proposed						
Pipelines	2.3	0.5	1.0	19.2	27.1	**50.2**
NTS Offtakes	0.2	1.1	0.7	2.4	0.3	**4.6**
PRSs	1.4	6.7	0.9	3.3	0.9	**13.2**
Other storage	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**3.9**	**8.3**	**2.6**	**24.9**	**28.3**	**68.0**

Table 3-1

3.2 POLICIES & PROCEDURES

3.2.1 INTRODUCTION

This section reviews the various statements made by Northern in support of their planning and decision making processes which drive and deliver LTS and Storage Capex Investment.

LTS and Storage Capex is determined by gathering forecast supply and demand data and using network simulation models to determine the optimum plant necessary to meet the capacity requirements. We have reached the conclusion, based on our limited review, that the planning work for development of the Network and in particular that of the local transmission and storage system has been carried out in a competent manner.

Appendix 1 reviews the financial and technical framework under which Northern operates, the structure it utilises to manage their assets effectively and the key policies it adopts to ensure it meets its statutory and licence obligations and other regulatory requirements.

3.2.2 SCOPE OF POLICIES AND PROCEDURES

Northern carries out network planning in accordance with policy NGN/PI/NP/18, and T/PL/NP2 sets out the procedure for the validation of high pressure distribution network analysis models, which covers the Local Transmission System (LTS). A description was given of the process used to develop and match the network models to the actual network, including the network validation process. Northern's network planning arrangements are reviewed in Appendix 2.

Northern uses a range of network analysis tools including GBNA for < 7bar networks and graphical Falcon for steady state and transient analysis of the Local Transmission System (LTS), and has described how demands are derived for each. This indicates an appropriate level coordination and consistency between the analysis sections dealing with different pressure tiers.

An important feature of network modelling is the determination of the diurnal storage volumes needed under 1 in 20 network conditions. Northern uses the Storage Simulation Model (SSM). SSM uses demand data, diurnal swing information and forecast performance data taken from system operation as core inputs. This information is run through a statistical model with demand and weather forecasting data to simulate the network's storage requirements. Sensitivity analyses are used to validate the SSM result.

In terms of financial controls, Northern operates a Capital Screening Group (CSG) and an Investment Steering Group (ISG), to which a Business Case and an Investment Appraisal must be submitted for any capital expenditure exceeding £100,000. NPC and NPV principles apply to project selection and this ensures that operating expenditure/maintenance costs are taken into account in capital expenditure decisions.

3.2.3 REVIEW AND UPDATE PROCESS

For its asset management decision making, Northern has adopted the suite of policies and procedures from National Grid. However, they are currently developing procedures based on the principles of BSI PAS55. These procedures will prioritise actions to ensure that the appropriate type and quality of data is available to support key business decisions in investment management.

Northern have described the process for updating the key parameters of the SSM model on an annual basis, and report updating the model data set for 2006/7. The current version of the model was introduced in 2003, and no revisions have been made since DN sales. Northern report that it has no immediate plans to undertake further significant revisions.

3.2.4 EFFICIENCY AND PRODUCTIVITY

Sourcing the construction of Northern's major pipeline projects is managed through UUOL. All projects are subject to competitive tender arrangements.

Project Completion Reviews are carried out where project spend exceeds £100,000. These reviews aim to confirm that all project objectives are delivered, and to identify and justify any discrepancies including between actual and budgeted cost. A Post Investment review (PIR) is carried out for all projects with an expenditure greater than £0.5m or when specifically required by the ISG. The PIR assesses the efficiency and effectiveness of a capital expenditure decision and the management of its implementation, with the objective amongst others of identifying and implementing corrective actions on the project under review or on similar projects. Northern and UUOL jointly undertake PIRs, and the results from the PIRs are formally presented to the ISG quarterly.

3.3 HISTORICAL PERFORMANCE

3.3.1 INTRODUCTION

Northern's historical expenditure was reviewed in detail as part of the 1 year review.

This section summarises Northern's expenditure on the LTS in the period 2002/03 to 2005/06.

3.3.2 DEFINITION OF ACTIVITY

The Local Transmission System (LTS) operates at pressures > 7barg and transports gas from NTS offtakes to distribution systems and directly to some large users. The LTS is the primary source of additional diurnal storage related to demand growth, and is also required to transmit diurnal storage where this is procured from the NTS. Expenditure to reinforce the LTS is driven by increases in demands, but investment in reinforcement pipelines is generally more economic where a project provides capacity to meet more than one year's growth in demand. Therefore expenditure on LTS projects tends to be lumpy.

3.3.3 ESTABLISH UNDERLYING COSTS

Northern's capital expenditure on LTS & storage over the period 2002/03 to 2005/06 is shown in the chart below. The chart shows actual expenditure restated at 2005/06 prices.

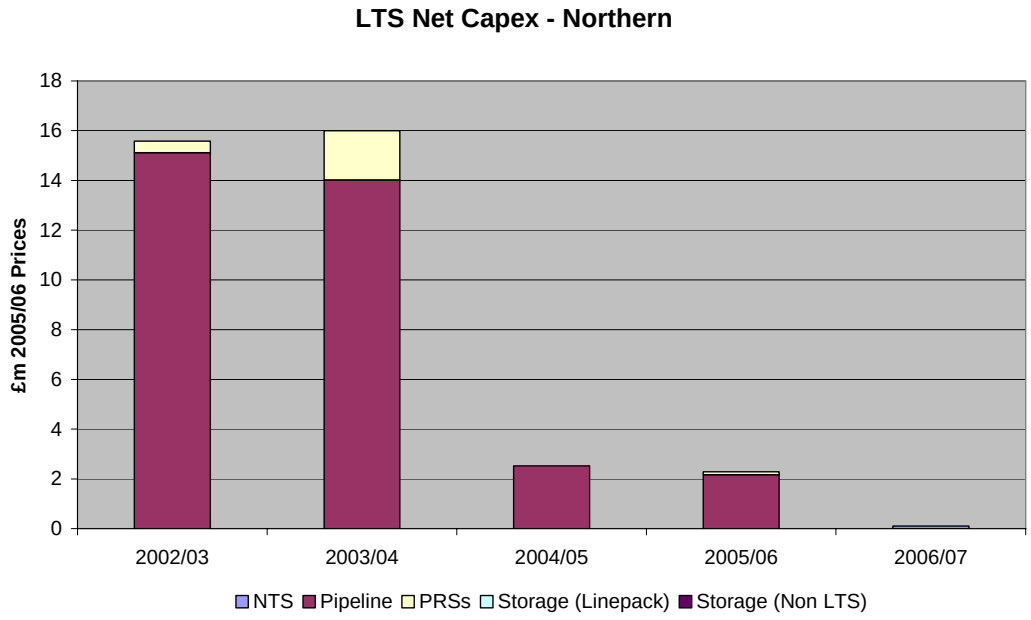

Figure 3-1

This expenditure provides sufficient LTS capacity well beyond 2005/06. In addition the capacity of a salt cavity is to be increased for 2007/08 to provide additional diurnal storage, with significant additional LTS capacity planned for 2012/13.

3.3.4 EFFICIENT LEVEL OF COSTS

Over the period 2002/3 to 2005/6, Northern's expenditure on LTS capital projects amounted to £36.19m (2005/6 prices).

Two major projects accounted for 77% of this expenditure, the West Hull reinforcement 17.5 km 1050mm (Commissioned 2004/05, £13.1m outturn costs), and the Cowpen Bewley to Warden Law 30.3km 300mm (Commissioned 2003/04, £13.1m outturn costs).

These projects were reviewed in detail in the 1 year reports and have been included in the unit cost assessment described in Appendix 6.

3.4 FORECAST

3.4.1 INTRODUCTION

The efficiency of forecasting LTS and storage capital expenditure requirements depends on the performance of the GDN in network planning and design and on the effectiveness of their business planning processes. The network planning and design performance was reviewed as part of the 1 year review, with specific questions asked in this review regarding diurnal storage planning and the control of expenditure. The policies and procedures applied by Northern, including their business planning processes were reviewed in section 3.2. No issues have been identified in relation to Northern's performance in these areas, although specific project assumptions are challenged below.

LTS & storage expenditure requirements are driven in the main by the projected growth in the 1 in 20 peak day over the period.

Northern are predicting an increase in demand over the 4 year period 2005/06 to 2008/09 of 4.5%, whereas National Grid's Transportation's Ten Year Statement 2006 is predicting that 2008/09 demand in Northern's area will be 2% higher than in 2005/06. For comparison, over the 4 years from 2001/02 to 2005/06 peak demand stayed at around the same level.

Northern has provided information on demand forecasting performance over the period since 2000. It said that on a year ahead basis it aimed for a target accuracy of +/- 1.5% for annual demand which was achieved apart from 2003. Nevertheless peak demands on a 3 year ahead basis, the typical horizon for investment decisions, have generally been over-forecast against revised estimates of 1 in 20 demand made prior to or just after the winter in question.

Overall Northern is forecasting a rise in peak demand of 9 GWh/day per year over the period from 2006/07 to 2012/13 whereas National Grid are forecasting a rise averaging 13 GWh/day per year over the same period.

The following table shows Northern's forecasts of demand over the period to 2012/13 and the rate of increase in the forecast demand.

Peak demands North and North East LDZs in aggregate	Northern forecasts GWh/day	% annual increase in peak demand from 2006/07
2006/07	560	N/A
2008/09	577	1.5%
2012/13	614	1.5%

Table 3-2

If Northern had used the National Grid peak demand forecasts, its LTS investment plans would have shown different phasing of investments to those shown in the BPQ submission.

Demand forecasts accuracy was raised with Northern including the uncertainties surrounding current trends in usage, and they considered they were using the most appropriate forecasts for planning purposes. Given the historical trend for LDZ demand to be over-forecast by the Network, there is a risk that some of the projects proposed by Northern to provide additional LTS capacity will not be needed in the period up to

2012/13. However, against this, National Grid is forecasting slightly higher demand growth over the period than Northern's forecasts.

Our work has not included an analysis of demand forecasts in sufficient depth to make a judgement on the most appropriate forecasts to use for capital expenditure planning. In this report we have carried out a cost analysis, assuming the GDN proposed demand forecasts.

The level of LTS & storage future investment is also driven by the level and pattern of historical investment, since individual investments can provide capacity for a number of future years.

3.4.2 COMPANY PROPOSALS

The figure below shows the company projections of capital expenditure on LTS & storage projects.

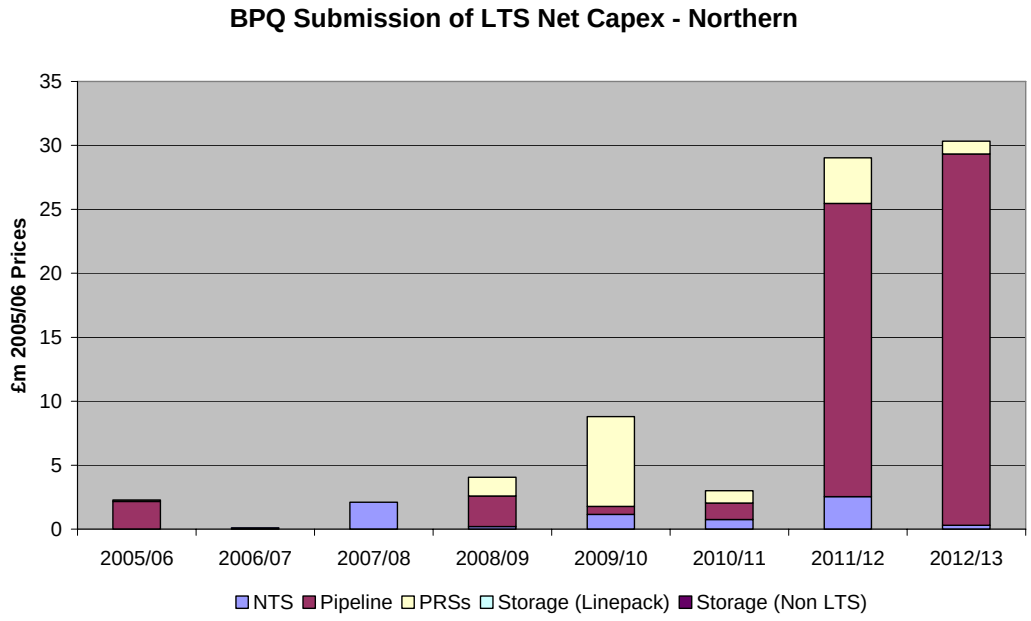

Figure 3-2

The following schemes have been reviewed:

Pannal offtake.

- Project costs: £2.0m
- Project commissioning date: 2007/08
- Network/Demand Constraints: NE LDZ is due to lose the Catshaw - Totley Storage Pipeline in 2007/08. This pipeline is located within and owned by National Grid Distributions Networks but the storage contained within it is currently utilised by Northern Gas Networks. This arrangement will terminate prior to the winter of 2007/08. The upgrade at Pannal is required for the additional flow through the site to replace the lost storage. This scheme also enabled the deferment of Tyresal Regulator installation from 2006 to 2009/10.

Keighley to Calder Valley 20km of 1050mm 38 bar pipeline

- Project costs: £28.0m
- Project commissioning date: 2012/13
- Northern state that the project provides reinforcement of the Calder Valley where the inlet pressure to the system low point at Hebden Bridge is forecast to fail. Northern report that network analysis predicts the project will be required for 2013/14, and add that this result is extremely sensitive to demand levels and have therefore programmed the project for 2012/13.
- The project also provides additional diurnal storage local to the Leeds/Huddersfield area (estimated at 0.3mcm), and is consistent with maintaining the storage take from the NTS at 2006/07 levels.
- Project adjustments are discussed in section 3.4.4.

Rawcliffe to Chapel Haddlesey 12km 38bar 1200mm 38 bar pipeline.

- Project costs: £22.7m
- Project commissioning date: 2011/12
- This project forms part of the specific reinforcement to supply the potential siteworks load for Eggborough Power Station.
- Project adjustments are discussed in section 3.4.4.

3.4.3 PB POWER PROPOSALS

Our proposed projections are derived from a review of the specific projects costs plus a review of the overall expenditure required to meet load growth (called the capacity adjustment). Our proposed costs are discussed in section 3.4.4.

The need for diurnal storage capacity is an important indicator of load growth and driver for investment, alongside the 1 in 20 peak demand.

The figure below shows the diurnal storage capacity installed within the GDN and to be procured from the NTS over the period to 2012/13.

Provision of Diurnal Storage Capacity - Northern

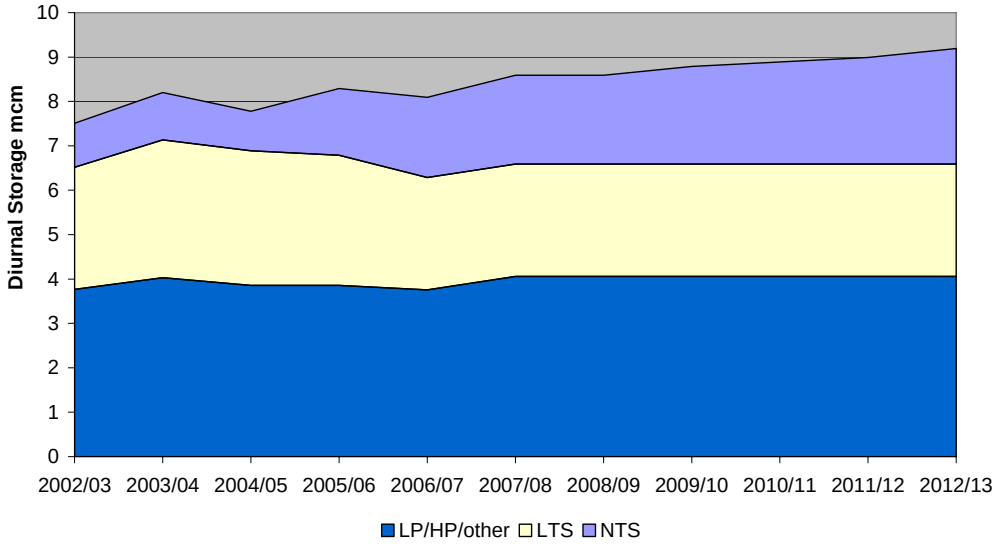

Figure 3-3

In 2006/07, 22% of diurnal storage is procured from the NTS, and in 2009/10, the last year of the current offtake arrangements, 25% of diurnal storage is planned to be taken from the NTS.

3.4.4 SPECIFIC COST AREAS

This section describes the specific costs reviewed by PB Power and how the separate capacity adjustment is calculated and applied.

Pipelines

We have carried out an analysis of a range of LTS pipeline construction projects (see Appendix 6). Our view is that the following unit costs are appropriate to LTS pipelines, reflecting the average lengths and conditions of construction.

LTS pipeline diameter	Unit cost (2005/06 prices)
1050 mm	£1.05m per km
1200 mm	£1.20m per km

Table 3-3

Although we would expect GDNs to capture ongoing efficiency improvements in both procurement and in construction methods throughout the plan period, we have not included any adjustments to the unit costs for such effects.

Applying these costs to the two pipeline projects described in Section 3.4.2, the following costs are proposed:

Keighley to Calder Valley 20km of 1050mm 38 bar pipeline –

- Northern's cost estimates less RPEs = £23.2m
- PB Power estimate excluding RPEs = £23.2m. The benchmark unit cost gives a total cost of £21m, but Northern have indicated that their costs include PRI works, including a new PRI at Hebden Bridge and the construction of the pipeline section to Hebden Bridge in the highway and we have included additional cost of £2.2m for the specific project factors.

Rawcliffe to Chapel Haddlesey 12km 38bar 1200mm 38 bar pipeline

- Northern cost estimates less RPEs = £19.8m
- PB Power estimate excluding RPEs = £17.3m including an allowance of 20% of the benchmark costs for specific route factors.
- Variance from Northern proposal = -£2.5m (excluding RPE effects)
- The Rawcliffe to Chapel Haddlesey is specifically to provide supplies to Eggborough power station and Northern report that the project has a 50% probability of progressing in 2011/12, and could be later. A decision to proceed with the scheme is not expected from the customer until 2008. Since the 1 year review, Northern have deferred the project from 2008/9 to 2011/12. We recommend that this expenditure is allowed subject to an ARCA being in place.

PRSs

Northern have included expenditure on a proposed preheater replacement programme under Other Operational capital expenditure. This expenditure is reviewed under that section of the report.

Capacity adjustment

We have reviewed above the major projects proposed by the Network. In addition, the Network has proposed a number of smaller projects which have not been reviewed.

We consider that the analysis used in this section provides supporting evidence to the specific project analysis carried out above and that where a GDN has made provision for a number of projects at various locations through their network, it provides a means of assessing the overall level of expenditure that gives the GDN flexibility to select the appropriate mix of small projects to remedy local constraints.

In order to assess whether the overall level of expenditure on capacity related projects is consistent with forecast increases in demand, this capacity related expenditure has been assessed against the stated requirements for incremental diurnal storage. Since diurnal storage is calculated as a percentage of peak demand, incremental diurnal storage is a good measure of incremental capacity requirements.

The GDN diurnal storage requirement is determined from the SSM model, with projected volumes determined by a number of factors, including demand forecasts and the capability of the LTS to profile its gas take from the NTS (and the ability of the NTS to deliver such volumes).

	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
North							
Peak demand GWh/d	266	269	274	278	282	285	290
Stated storage required mcm	3.684	3.739	3.794	3.836	3.876	3.916	3.95
North East							
Peak demand GWh/d	294	297	303	308	313	318	324
Stated storage required mcm	4.313	4.401	4.476	4.544	4.605	4.666	4.724
Total stated diurnal storage required mcm	7.997	8.14	8.27	8.38	8.481	8.582	8.674

Table 3-4

The above table shows Northern's projected demands and diurnal storage requirements over the period 2006/07 to 2012/13.

The following table shows the final storage requirements for 2006/07, showing that 22% of diurnal storage was supplied from the NTS.

Diurnal Storage Balance 2006/07	Storage Volume (mcm)
Final Storage Requirement	**8.046**
Storage availability	
- within GDN	6.273
- from NTS	1.773
Total Available	**8.046**

Table 3-5

GDNs have described the issues surrounding the availability of NTS linepack after the current arrangements end in 2009/10. We have estimated a notional cost of NTS linepack (if it were available) of £50m per mcm (see Appendix 5); we have called this our reference cost. Unit linepack costs in the LTS are driven by both the pressure range and the pipe diameter, and GDN plans show that large diameter pipelines are being installed to provide diurnal storage.

We recognise that LTS expenditure is lumpy in nature, but in this review period, the average length of proposed pipelines across all GDNs is 12km. We have estimated that a pipeline of this length produces up to 0.1mcm of diurnal storage (depending on pressure range and diameter), and typically around 0.05mcm. In other words, LTS

projects can be matched fairly closely to increased requirements for diurnal storage. It is also noted that new or modified PRSs can generate linepack at lower costs than new pipelines, and in some cases can provide diurnal storage increments in smaller steps to match requirements more precisely.

We therefore consider that GDNs should be able to meet their incremental diurnal storage associated with load growth at costs approaching our reference costs. We also recognise that linepack storage volumes reduce as demands increase and so the cost of meeting the total diurnal storage requirement (transmission capacity and storage considered together) will generally be higher than the cost of meeting the growth in diurnal storage alone. We have assumed a factor of 2 times applied to the reference cost is appropriate to allow for this effect.

Therefore where we consider that a GDN has a requirement to invest in diurnal storage over the period from 2006/07 to 2012/13 the efficient cost of constructing that capacity is assessed against 2 times the reference cost and an adjustment made where the costs exceed this threshold.

The following table shows the adjusted LTS Capex proposals, and the deduction of the non-capacity Capex to give the net adjusted Capex (capacity related). The table also shows this expenditure expressed on a cumulative basis from 2006/07 to 2012/13.

The table further shows the cumulative diurnal storage increment proposed by the GDN and the associated reference expenditure, also expressed on a cumulative basis.

	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Adjusted LTS Capex £m	0.1	2.1	3.9	8.3	2.6	24.9	28.3
Non-capacity Capex £m	0.0	0.0	0.5	0.5	0.7	15.5	1.8
Net adjusted Capex (capacity related) £m	0.1	2.1	3.4	7.8	1.9	9.4	26.5
Cumulative net Capex £m	0.1	2.2	5.6	13.4	15.3	24.7	51.1
Cumulative diurnal storage increment mcm		0.1	0.3	0.4	0.5	0.6	0.7
Reference expenditure £m	0.0	7.4	14.3	20.2	25.8	31.4	36.7
Capacity adjustment £m	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 3-6

If the cumulative net Capex is more than 2 times the cumulative reference expenditure, consideration is given to a capacity expenditure adjustment. Where there is non-zero capacity adjustment we have investigated the reasons for the adjustment. No capacity adjustment applies to Northern.

3.4.5 REAL PRICE EFFECTS

Section 2.7 sets out the real price effects assumed by NGN in their BPQ proposals and also the real price effects proposed by PB Power.

In addition to any efficiency adjustments, the Network costs have been normalised by adjustments to remove the GDN real price effects and the PB Power real price effect assumptions have subsequently been added in deriving the proposed allowances.

3.4.6 RECOMMENDATIONS

The following figure summarises our capital expenditure proposals for the price control period (2008/09 to 2012/13) for LTS & storage. The build-up of these proposals is given in section 3.1.

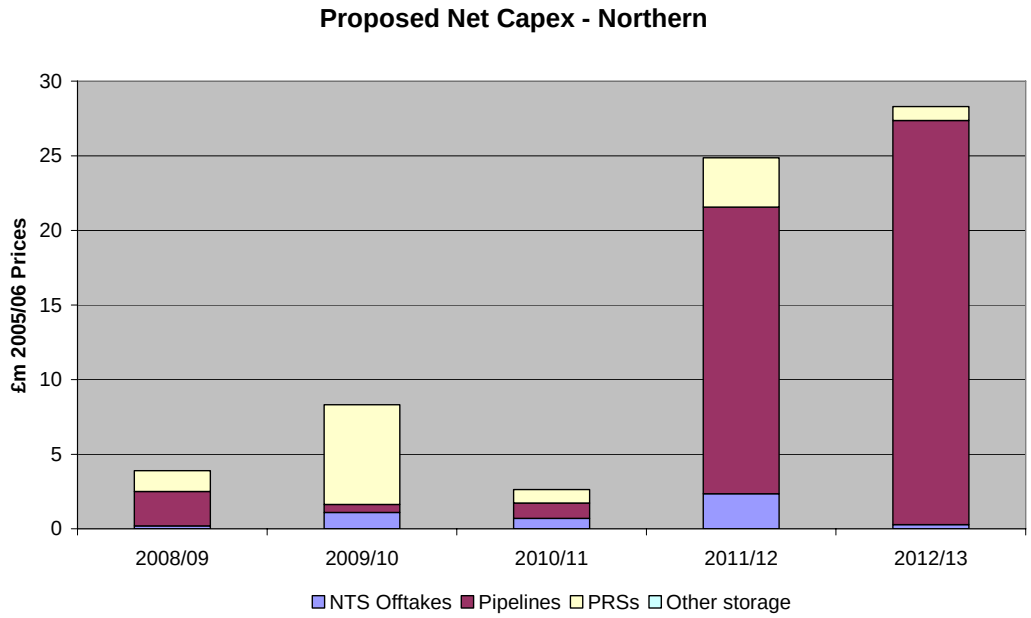
Proposed Net Capex - Northern
£m 2005/06 Prices
30
25
20
15
10
5
0
2008/09
2009/10
2010/11
2011/12
2012/13
NTS Offtakes
Pipelines
PRSs
Other storage

Figure 3-4

4 CONNECTIONS CAPEX

4.1 SUMMARY

Net Capex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission						
New Housing	1.2	1.2	1.3	1.3	1.3	**6.4**
Existing Housing	6.7	6.9	7.2	7.4	7.5	**35.7**
Non-Domestic	1.1	1.0	1.0	0.9	0.9	**4.9**
Total	**9.0**	**9.2**	**9.5**	**9.5**	**9.7**	**47.0**
Normalisation Adjustments						
New Housing	0.0	0.0	0.0	0.0	0.0	**0.0**
Existing Housing	0.0	0.0	0.0	0.0	0.0	**0.0**
Non-Domestic	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Normalised BPQ						
New Housing	1.2	1.2	1.3	1.3	1.3	**6.4**
Existing Housing	6.7	6.9	7.2	7.4	7.5	**35.7**
Non-Domestic	1.1	1.0	1.0	0.9	0.9	**4.9**
Total	**9.0**	**9.2**	**9.5**	**9.5**	**9.7**	**47.0**
Adjustments						
New Housing	-0.8	-0.8	-0.8	-0.8	-0.8	**-4.0**
Existing Housing	-0.6	-0.8	-1.0	-1.2	-1.3	**-5.0**
Non-Domestic	-0.8	-0.8	-0.8	-0.7	-0.7	**-3.8**
Total	**-2.2**	**-2.4**	**-2.7**	**-2.7**	**-2.9**	**-12.8**
Proposed						
New Housing	0.5	0.5	0.5	0.5	0.5	**2.3**
Existing Housing	6.1	6.1	6.1	6.2	6.2	**30.7**
Non-Domestic	0.3	0.2	0.2	0.2	0.2	**1.2**
Total	**6.8**	**6.8**	**6.8**	**6.9**	**6.9**	**34.2**

Table 4-1

4.2 POLICIES & PROCEDURES

NGN Policies and Procedures associated with connections activities have been reviewed as detailed in Appendix 1. The various levels of engineering and safety documents together with the governance arrangements have been reviewed and no issues found.

The key policies covering the connection of new assets constructed by others to the Northern network are:-

- Connections Policy Manual

  The suite of documents forming the NGN Connections Policy Manual sets out the principles and policies applicable to all activities associated with connections to the Network and those activities relating to the point at which gas is supplied to customers. The activities include new connections, increases in demand, alteration, disconnection and taking ownership of pipes laid by others. Each is contained in a separate Policy Statement.

- Management Procedure for the design of 3rd Party System Extensions and Connections to NGN Networks

  NGN/PM/NP14 is for use in the design of all new mains, services and risers, to be connected to a parent main which is operating at a pressure not exceeding 7bar. It also includes the procedure for evaluation of alterations to existing services subject to increased demands. Its purpose is to provide a consistent and defensible approach to the sizing of services, stub connections and approach mains and the quotation of design pressures.

We are of the opinion that these documents provide a comprehensive commercial and technical methodology for the management of new connections to the Network.

4.3 HISTORICAL PERFORMANCE

4.3.1 INTRODUCTION

Connections Capex includes all expenditure associated with the provision of new customer connections to the below 7 bar distribution network. The workload volume is driven by customer requests for gas connections.

4.3.2 DEFINITION OF ACTIVITY

4.3.2.1 Gross Capex

Connections expenditure is allocated to the following customer categories:

- Connections to New housing
- Connections to Existing housing
- Connections to Non-domestic

The BPQ information details the mains and services expenditure against these categories. Expenditure on governors associated with new connections is also included and is allocated to district or service governor categories.

Mains activities also include specific reinforcement necessitated by individual requests for a new connection to the network. Specific reinforcement is subject to an economic test to determine the associated customer contribution.

4.3.2.2 Net Capex

Connections Net Capex consists of the expenditure which is not re-charged to the customer including the Domestic Load Connection Allowance (DLCA)[1], the Final Connection Allowance[2] and the cost of Employer Ordered Works (EOW). EOW is work that is essential to complete the connection to the distribution system but is not foreseen when the quotation to the customer is given, e.g. additional work resulting from inaccurate mains records.

4.3.3 ESTABLISH UNDERLYING COSTS

Figure 4-1 shows the trends in total mains and total services gross expenditure for the period 2002/03 to 2006/07.

[1] The Domestic Load Connection Allowance (DLCA) comprises the mains connection and up to the first 10m of service pipe in the public highway. Qualifying premises must be situated within 23m of a relevant main (Gas Act Section 10 para 2(a)).

[2] Final connection allowances are applicable to non-domestic loads up to 2,196,000kWh situated within 23m of a relevant main. Since 2005 the majority of GDNs have withdrawn this allowance.

The mains expenditure increase in 2005/06 is driven by a 13% increase in workload volume and a 72% increase in unit cost.

It has not been possible to analyse these expenditure movements further due to inconsistencies in the disaggregation of connections data to mains and services level for this period (see Section 4.3.4.1 - Data Accuracy).

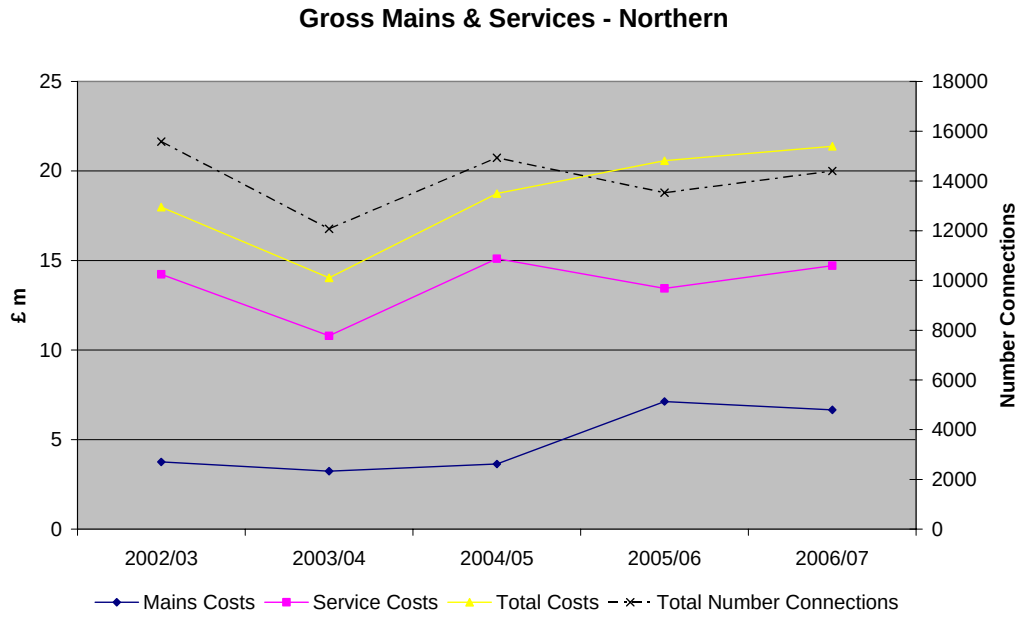

Figure 4-1

The trend in total cost per connection for the period 2002/03 to 2006/07 is included in the chart in Section 4.4.3.1 for the period to 2012/13.

4.3.4 PROPOSED EFFICIENT LEVEL OF COSTS

4.3.4.1 Data Accuracy

We have examined the 2005/06 and 2006/07 BPQ data returned by the GDNs to determine the degree of consistency in the allocation of expenditure to the mains and services activity categories.

Generally, the GDNs have stated that their management information systems do not generate information in the format and degree of disaggregation required. Therefore, information has been synthesised and accuracy cannot be assured, particularly the expenditure allocations between mains and services activities. It is evident that there is a significant degree of inconsistency between the GDNs in terms of the BPQ information returned, including wide variations in mains and services unit costs.

In addition to our concerns regarding the reliability of the reported split of costs between the three categories of connection, the costs associated with feeder mains, specific reinforcement and governors must be allocated between these categories. Following feedback from the GDNs these costs have been allocated between the Non-Domestic and New Housing categories only, as we have been advised that there is limited or no expenditure on these activities associated with Existing Housing connections.

Given the concerns outlined above we have investigated methods of minimising the impact of the allocation of costs between categories by carrying out benchmarking analysis on both a separate and total connections basis.

4.3.4.2 Analysis Process

We have developed expenditure projections for the efficient level of expenditure required by Northern to carry out its connections activities through benchmarking across GDNs, analysis of their workload assumptions, and review of their forecasts. The analysis process is described in detail in Section 2.

No normalisation adjustments have been identified for this activity.

No workload adjustments have been identified for this activity.

We have carried out analysis using both 2005/06 and 2006/07data. Having examined both years we concluded that 2006/07data provided the most robust analysis for the projections. In addition, we have carried out the analysis both at the total connections level and also at the level of separate analysis in each of the three connections activity categories.

The regression carried out for Existing Housing separately provided robust results, however, the regressions for the Non-Domestic and New Housing categories were less conclusive. We believe this is due in part to uncertainty of the correct allocation of costs between the connections categories and in part to the lack of precise allocation of specific reinforcement, feeder mains and governor installations costs.

We concluded that analysis of the total costs would deliver the most representative review of the effectiveness of the Connections operation. However, we have tested this conclusion by comparing the outcomes of both the total and separate analyses. By using each analysis we have derived the total expenditure which is considered appropriate for the number of connections proposed. We therefore generated a comparison for each year of the control period, for each GDN, giving a total of 40 comparisons.

Figure 4-2 below shows the number of these samples for each percentage variation. It can be seen that in almost 80% of the samples, the difference in outcome between the total and separate analysis was less than 4%. These results confirmed our view that the analysis at the total connections level was the most appropriate basis for our proposals.

The total connections analysis resulted in higher costs in 37 of the 40 sample comparisons.

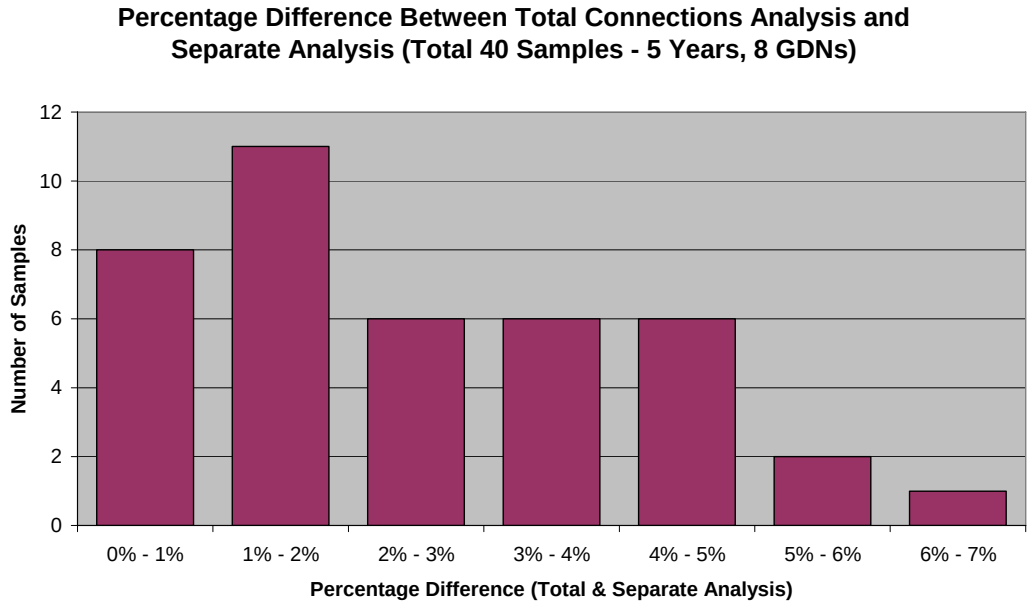

Figure 4-2

NGN has made significant organisational changes during 2005/06 to deliver efficiency improvements in the management and execution of all connections processes and activities. NGN has not quantified precisely the level of improvement expected but we are

of the view that efficiency savings within the range 5% in 2007/08 reducing to 2% in 2012/13 are appropriate. This range has been smoothed in the analysis process to 3% year on year over the forecast period, in addition to any catch up to the benchmark performance level by underperforming GDNs.

In order to derive our projections for efficient expenditure we have assumed that where a GDN is underperforming the benchmark, the gap with the benchmark will be reduced over the forecast period to 30% at 2012/13. Where a GDN is outperforming the benchmark the projection will be reduced year on year to match the GDN's out performance in 2012/13.

Finally, the projections are adjusted to incorporate Regional Factors and our Standard Real Price Effect assumptions, as specified in Section 2.7.

4.3.4.3 Benchmarking Analysis

A number of regression options have been explored, however, for most activities we have concluded that the most suitable regression is achieved by analysis of the logarithmic values of normalised costs and the chosen driver. A "basket of work" approach has been used to produce a driver based on a weighted average of a number of different work elements (pipe sizes). The driver is calculated by multiplying the work volume by a nominal unit cost for the activity. The approach is not sensitive to the actual level of these nominal unit costs, but works on the relative costs between work types.

This approach allows the analysis to fully reflect the workload forecast by the GDNs, adjusted for the period 2008/09 to 2012/13 as deemed appropriate by our consultants.

The starting point for setting the target benchmark is an Ordinary Least Squares (OLS) regression on the eight data points, one for each GDN, applicable in the base year (2006/07). The R^2 value indicates how well the variation in costs is explained by the variation in the workload driver.

The OLS regression calculation takes into account all the data points in determining the relationship between the costs and the workload driver. This relationship could be used to determine the frontier costs for each network, but these costs are unlikely to be efficient since generally only some networks will be operating at the efficiency frontier.

We therefore propose to obtain the benchmark cost relationship by adjusting the OLS regression line so that it reflects efficient network performance rather than average performance.

This relationship could be constructed by shifting down the regression line until all the data points are above the line except for one data point which is on the line. This is the Corrected Ordinary Least Squares (COLS) regression line.

However, we consider that there are differences between GDNs which may not be fully explained by the regression analysis and that it is reasonable to set the frontier relationship by shifting the regression line down to the upper quartile. This is the upper quartile COLS regression line and is shown in pink on the charts. This is the target which all under performing GDNs should move towards.

Where the regression uses log-linear analysis, the effect of rejecting the OLS regression line as the frontier relationship in favour of the upper quartile COLS regression line is to reduce the target costs of each network by the same percentage.

With this approach, 75% of networks will be performing at or below the frontier in the base year and these networks will be expected to continue to improve their performance over the period to 2012/13, and our proposed ongoing productivity improvements are set out in Section 4.4.4.1. The resulting target costs for 2012/13 are shown in yellow on the charts.

Total Connections

Figure 4-3 shows the benchmarking analysis of 2006/07 connection costs for the total connections category.

Workload and costs associated with large scale Local Authority modernisation schemes in Scotland have been excluded from the regression analysis as this is a low unit cost activity which is unrepresentative of the general level of costs associated with connections to existing housing.

Northern's performance ranks 4th best after allowing for regional factors.

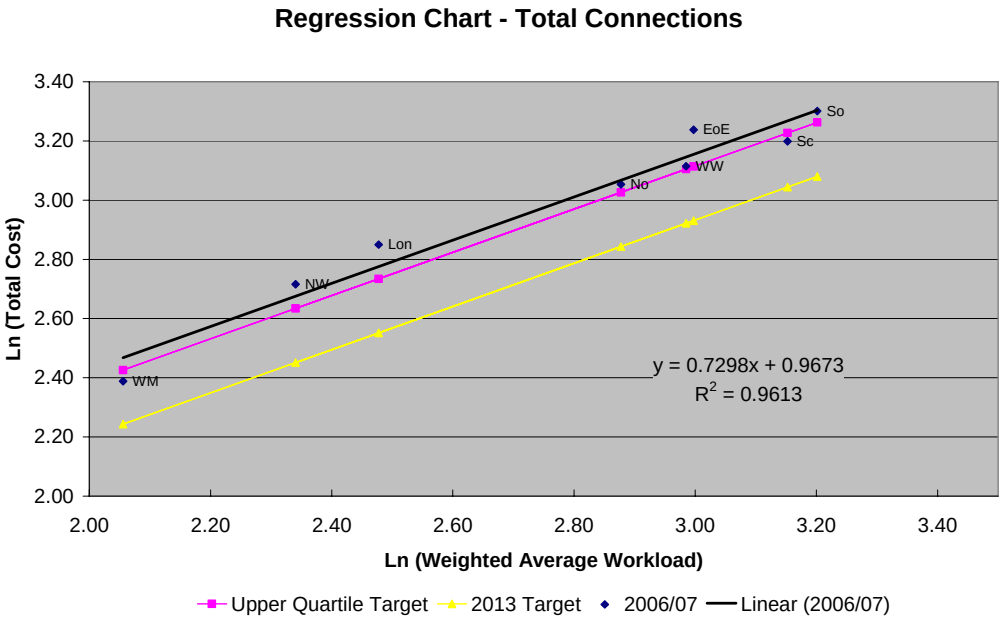

Figure 4-3

New Housing Connections

Figure 4-4 shows the benchmarking analysis of 2006/07 connection costs for the new housing activity category.

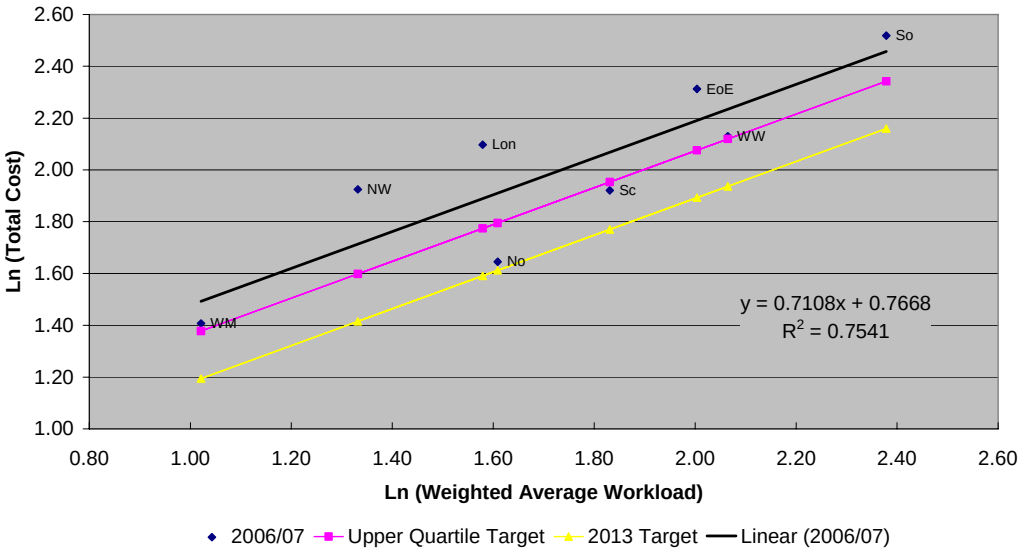

Figure 4-4

Existing Housing Connections

Figure 4-5 shows the benchmarking analysis of 2006/07 connection costs for the existing housing activity category.

Workload and costs associated with large scale Local Authority modernisation schemes in Scotland have been excluded from the regression analysis as this is a low unit cost activity which is unrepresentative of the general level of costs associated with connections to existing housing.

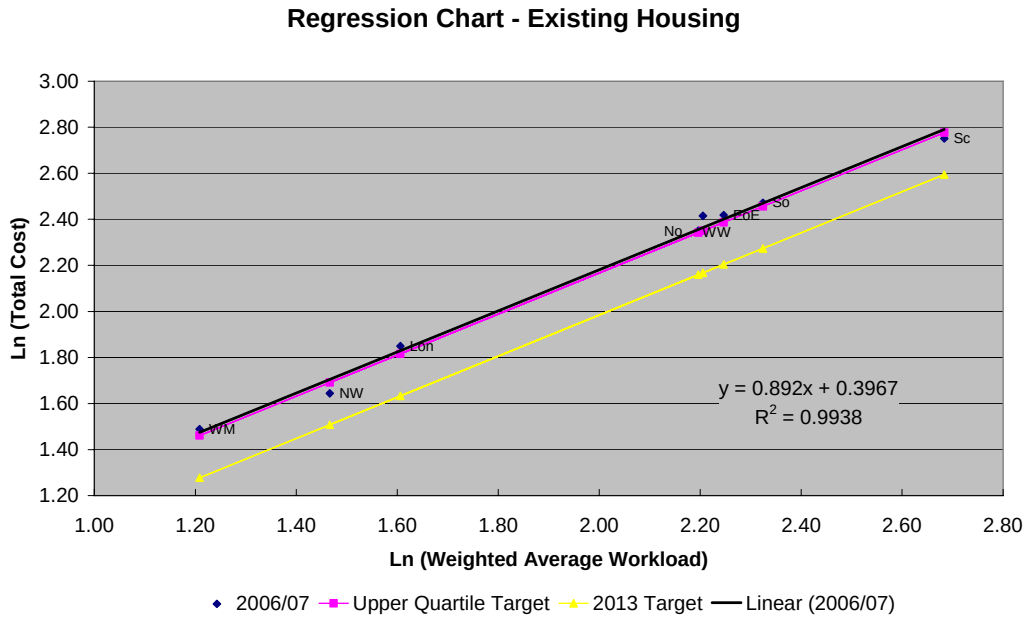

Figure 4-5

Non-domestic Connections

Figure 4-6 shows the benchmarking analysis of 2006/07 connection costs for the non domestic activity category.

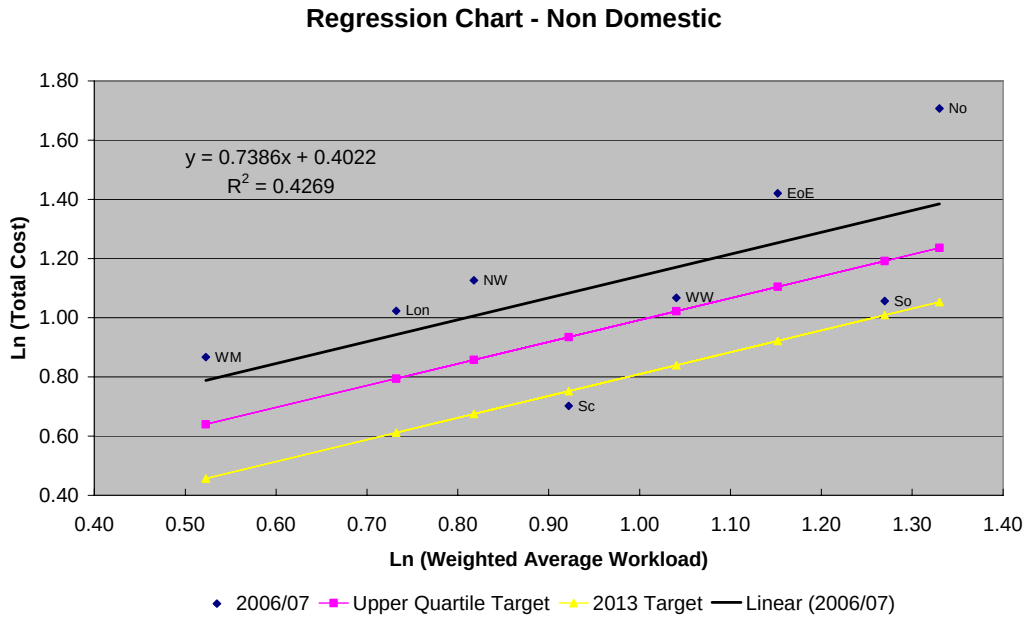

Figure 4-6

4.4 FORECAST

4.4.1 INTRODUCTION

During the period 2002/03 to July 2005, Fulcrum Connections (FC) undertook all connections activities on behalf of Northern and the other GDNs. The Service Provider Contract (SPC) formed the basis for the contractual relationship between Northern and FC. NGG coordinated the interface between FC and the GDNs.

Immediately following acquisition of the network in June 2005, NGN transferred management of the Fulcrum Connections (FC) Service Provider Contract (SPC) to United Utilities Operations Ltd (UUOL).

NGN has assigned delivery of the entire Connections business to UUOL with effect from 1st August 2006.The cost benefits from these arrangements will be assessed as implementation proceeds and develops. NGN forecasts for the period 2008/09 to 2012/13 assume no real cost increases for Connections activities.

In assessing the Network's expenditure projections for connections activities we have reviewed the annual workload volumes proposed together with the forecasting assumptions applied.

4.4.2 COMPANY PROPOSALS

4.4.2.1 Key Assumptions

In addition to the generic assumptions for Northern, detailed in Section 2.7, NGN has stated that their connections expenditure forecasts also take into account the following assumptions and issues:

Gross expenditure

- Connections unit costs will be maintained at present levels on a real basis.
- No significant changes to the connections market.
- Workload volumes will follow historic trends.
- New housing market share 2008/09 to 2012/13 - 20%
- Existing housing market share 2008/09 to 2012/13 - 98%

Net expenditure

- The unit cost of DLCA is estimated at £620
- The DLCA will apply to 90% of services to existing housing.
- The DLCA will apply to 7% of services to new housing.
- A revised quotation policy for mains work will be implemented with effect from 1 April 2007 and will incorporate a 'risk premium' to compensate for 'time lag'[3].
- Charges for new housing and existing housing services will not incorporate a 'risk premium' to compensate for 'time lag' due to the monopoly provider principle.
- The non domestic Final Connection Allowance is withdrawn with effect from 1 April 2007.

[3] Historically, a significant proportion of Net Capex resulted from work in progress, i.e. work that was quoted before a price increase but executed after the price change. Connection charges were based on current costs at the time of quotation and, therefore, when costs were increasing under recovery occurred.

Based on the Net Capex assumptions specified, we have examined the BPQ data for a sample forecast year and have assessed the expenditure associated with EOW and 'time lag' at approximately 17% of the total mains and services gross expenditure. We assume that this level of Net Capex may also include costs associated with unaccepted quotations.

4.4.2.2 Workload Forecasts

Figures 4-7 and 4-8 show Northern's connections mains and services workload forecasts.

NGN has indicated that the workload forecast for specific reinforcement mains includes feeder mains as the information for these activity categories cannot be separated. The forecast for feeder mains is zero therefore.

Northern's workload forecasts for the period 2008/09 to 2012/13 have been reviewed taking into account historical trend levels and NGN's assumptions.

The total connections workload is forecast to increase by 9.0% over the period 2008/09 to 2012/13. This increase is driven by increased activity in both the new and existing housing connections categories. We have considered whether to reduce the forecast workload volumes and have concluded that no adjustment should be made.

The non-domestic connections workload is forecast to decrease by 2.4% over the period 2008/09 to 2012/13 presumably due to NGN's decision to withdraw the final connection allowance with effect from 1st April 2007.

We recommend that the BPQ mains workload forecasts are accepted.

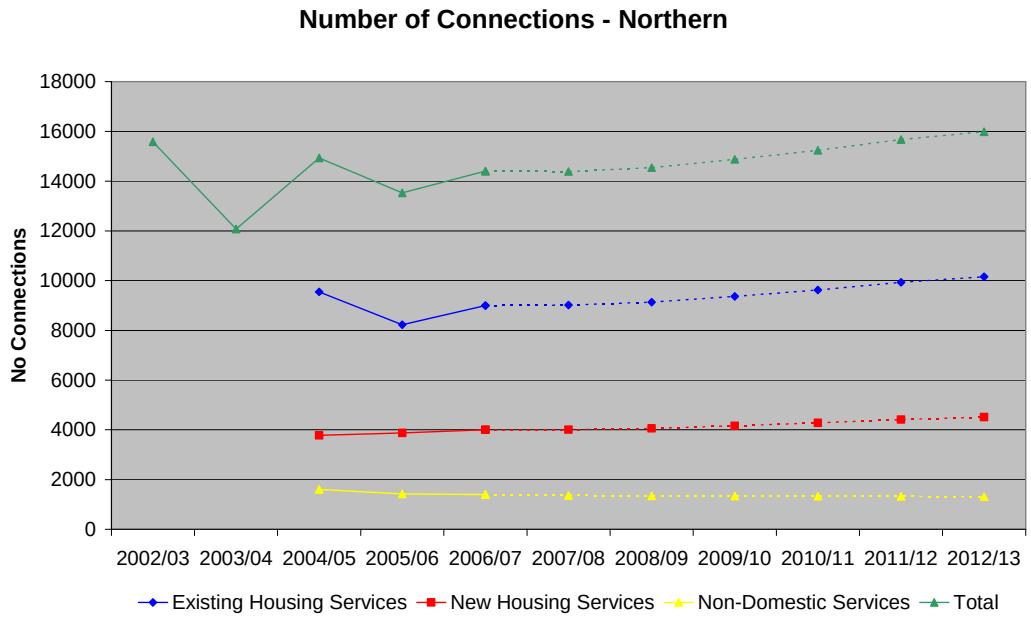

Figure 4-7

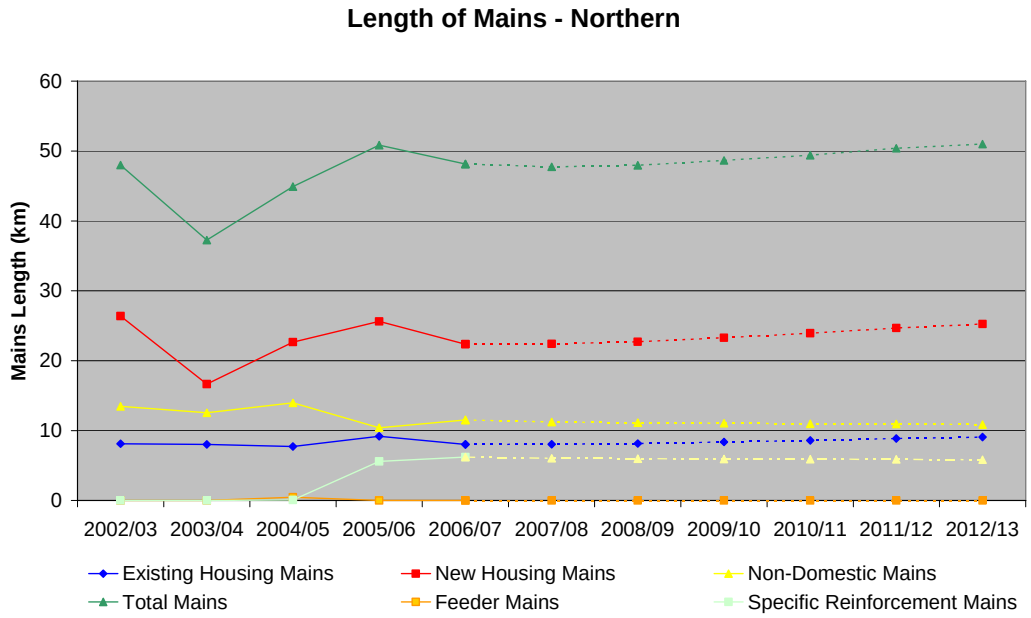

Figure 4-8

4.4.3 PB POWER PROPOSALS

The regression analysis is used to determine the total Gross Capex which is appropriate for the proposed workload. The regression workload drivers are then used to apportion this total expenditure between all work activities based on the proposed workloads for each activity. The costs for feeder mains, specific reinforcement and governors have been split between New Housing and Non-Domestic Connections in proportion to the number of connections in each category.

4.4.3.1 Total Connections

Figure 4-9 shows Northern's gross expenditure projections for the total connections category over the forecast period 2008/09 to 2012/13.

The recommended expenditure projection reflects closing the gap with the target performance to 30% at 2012/13.

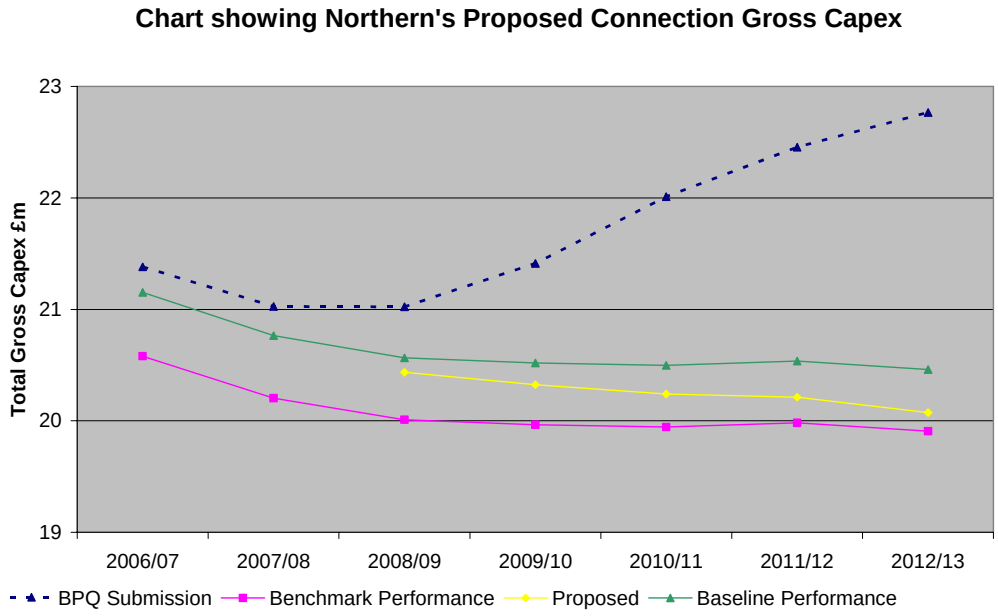

Figure 4-9

Figure 4-10 shows Northern's cost per connection projections for total connections over the forecast period 2008/09 to 2012/13.

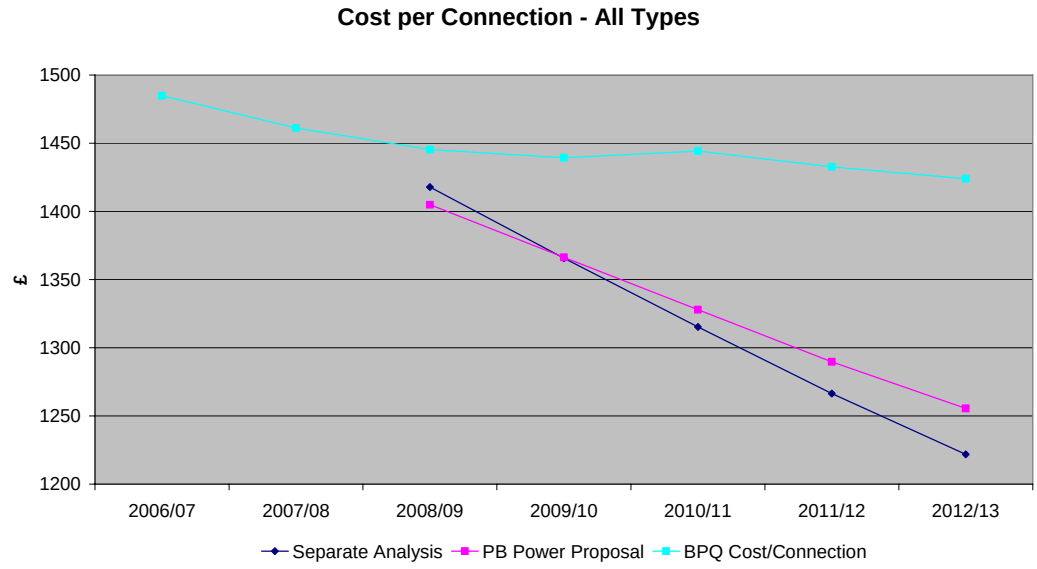

Figure 4-10

Gross expenditure for total connections is summarised in Table 4-2 below.

Total Connections Gross Capex All figures £m 2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Gross Submission	21.0	21.4	22.0	22.5	22.8	109.7
Normalisation Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Normalised Gross BPQ	21.0	21.4	22.0	22.5	22.8	109.7
Workload Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Efficiency Adjustment	-0.6	-1.1	-1.8	-2.2	-2.7	-8.4
Total Adjustments	-0.6	-1.1	-1.8	-2.2	-2.7	-8.4
Projected Gross	20.4	20.3	20.2	20.2	20.1	101.3

Table 4-2

4.4.3.2 New Housing Connections

Figure 4-11 shows Northern's cost per connection projections for the new housing connections category over the forecast period 2008/09 to 2012/13.

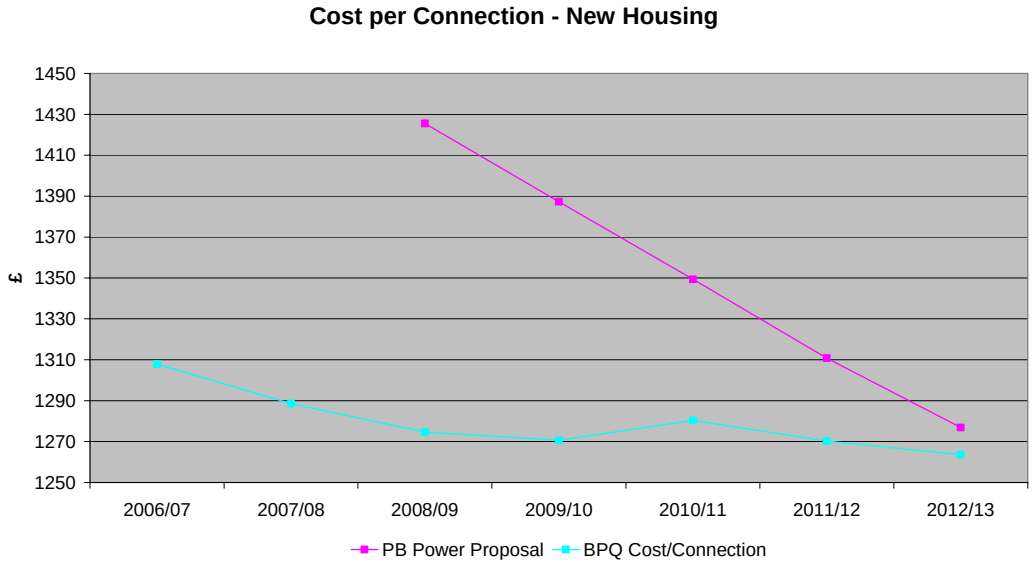

Figure 4-11

Gross expenditure for new housing connections is summarised in Table 4-3 below.

New Housing Gross Capex All figures £m 2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Gross Submission	5.2	5.3	5.5	5.6	5.7	27.3
Normalisation Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Normalised Gross BPQ	5.2	5.3	5.5	5.6	5.7	27.3
Workload Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Efficiency Adjustment	0.6	0.5	0.3	0.2	0.1	1.6
Total Adjustments	0.6	0.5	0.3	0.2	0.1	1.6
Projected Gross	5.8	5.8	5.8	5.8	5.8	28.9

Table 4-3

4.4.3.3 Existing Housing Connections

Figure 4-12 shows Northern's cost per connection projections for the existing housing connections category over the forecast period 2008/09 to 2012/13.

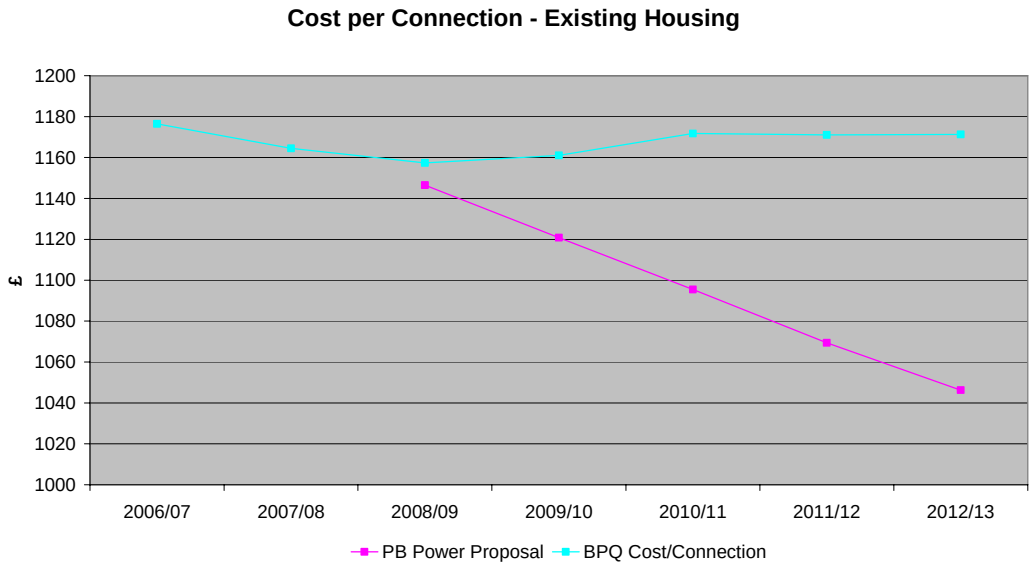

Figure 4-12

Gross expenditure for existing housing connections is summarised in Table 4-4 below.

Existing Housing Gross Capex All figures £m 2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Gross Submission	10.6	10.9	11.3	11.6	11.9	56.3
Normalisation Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Normalised Gross BPQ	10.6	10.9	11.3	11.6	11.9	56.3
Workload Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Efficiency Adjustment	-0.1	-0.4	-0.7	-1.0	-1.3	-3.5
Total Adjustments	-0.1	-0.4	-0.7	-1.0	-1.3	-3.5
Projected Gross	10.5	10.5	10.5	10.6	10.6	52.8

Table 4-4

4.4.3.4 Non-domestic Connections

Figure 4-13 shows Northern's cost per connection projections for the non domestic connections category over the forecast period 2008/09 to 2012/13.

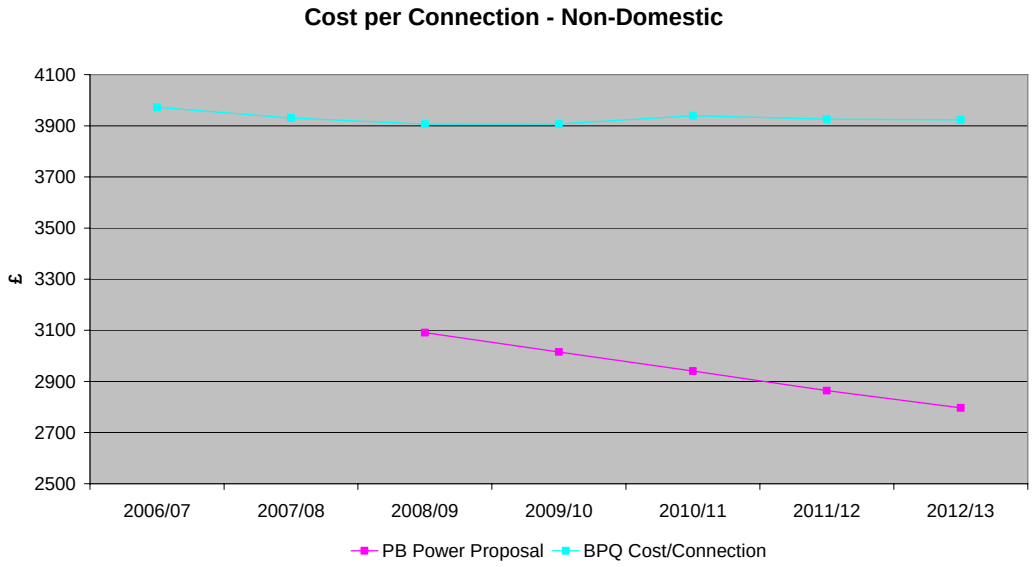

Figure 4-13

Gross expenditure for non domestic connections is summarised in Table 4-5 below.

Non-Domestic Gross Capex All figures £m 2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Gross Submission	5.3	5.2	5.2	5.2	5.2	26.2
Normalisation Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Normalised Gross BPQ	5.3	5.2	5.2	5.2	5.2	26.2
Workload Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Efficiency Adjustment	-1.1	-1.2	-1.3	-1.4	-1.5	-6.5
Total Adjustments	-1.1	-1.2	-1.3	-1.4	-1.5	-6.5
Projected Gross	4.2	4.0	3.9	3.8	3.7	19.6

Table 4-5

4.4.3.5 Connections Net Capex

Our recommended connections Net Capex projections are based on the benchmarking analysis Gross Capex projections and incorporate the following assumptions:

- DLCA cost - Determined at 58% of existing housing services and 5% of new housing services gross Capex, based on the weighted average of the GDN DLCA assumptions for the base year 2006/07.
- EOW cost - Assessed at 6% of combined mains and services gross expenditure for all connections categories, which is the lowest level assumed by the majority of the GDNs.
- Final Connection Allowance (non-domestic) - nil
- Costs associated with time lag & unaccepted quotations - nil

Our recommended Net Capex projections are detailed in Section 4.4.6 - Recommendations.

4.4.4 SPECIFIC COST AREAS

4.4.4.1 Efficiency Improvements

NGN has made significant organisational changes during 2005/06 to deliver efficiency improvements in the management and execution of all connections processes and activities. NGN has not quantified precisely the level of improvement expected but has

stated that their forecasts assume no real price increases from 2005/06, i.e. costs will be contained at 2005/06 levels plus RPI.

We are of the view that efficiency savings within the range 5% in 2007/08 reducing to 2% in 2012/13 are appropriate. This range has been smoothed in the analysis process to 3% year on year over the forecast period.

4.4.4.2 Waste Management Regulations

The EU Landfill Directive is setting tighter standards on wastes that can go to landfill. Following recent changes in Regulations (July 2005) to bring England and Wales in line with the Directive, it is expected that more waste will be classified as “non-hazardous” rather than “inert” as at present. The standard Landfill Tax charge is currently £21/tonne for non-hazardous waste, with a lower rate of £2/tonne charged for inert waste. The Government has stated that the standard rate for non-hazardous waste will increase by at least £3 annually to a rate of £35 in 2010.

We acknowledge that the changes to the Regulations will generate additional costs but we judge that GDNs are able to mitigate these by improving the management and scope of operational practices such as minimisation of excavation, re-use of materials, recycling, conditioning and materials testing to establish inert status.

The effect of the increased tax charge has been assessed and we have concluded that the resulting additional expenditure associated with Capex operations is minimal and, therefore, no adjustment has been made to our expenditure projections. However, we recognise that there is uncertainty regarding the cost implications of these Regulations and recommend that the GDN be required to model the costs, based on our workload projections, for further consideration.

4.4.5 REAL PRICE EFFECTS

The recommended cost projections presented in Section 4.4.6 incorporate our real price inflation assumptions, as detailed in Section 2.7.

4.4.6 RECOMMENDATIONS

4.4.6.1 Workload

We recommend that our projections for Northern's workload volumes are accepted, as detailed in Table 4-6 below.

Feeder mains are included with specific reinforcement mains as NGN cannot separate the information for these activity categories.

BPQ Workload Volumes	2008/09	2009/10	2010/11	2011/12	2012/13
District Governors	10.0	10.0	10.0	10.0	10.0
Existing Housing Mains <=180mm	7.9	8.1	8.3	8.6	8.8
Existing Housing Mains>180mm	0.3	0.3	0.3	0.3	0.3
Existing Housing Services	9135	9370	9629	9930	10157
Feeder Mains <=180mm	0.0	0.0	0.0	0.0	0.0
Feeder Mains >180mm	0.0	0.0	0.0	0.0	0.0
New Housing Mains <=180mm	21.9	22.5	23.1	23.8	24.4
New Housing Mains >180mm	0.8	0.8	0.8	0.8	0.9
New Housing Services	4060	4164	4279	4413	4514
Non-Domestic Mains <=180mm	10.0	10.0	9.9	9.9	9.8
Non-Domestic Mains >180mm	1.1	1.1	1.1	1.1	1.1
Non-Domestic Services	1350	1342	1333	1330	1317
Service Governors	130	130	130	130	130
Specific Reinforcement Mains <=180mm	5.4	5.4	5.3	5.3	5.3
Specific Reinforcement Mains >180mm	0.6	0.6	0.6	0.6	0.6

Table 4-6

4.4.6.2 Expenditure

Our recommended Net Capex projections are detailed in Tables 4-9, 4-10 and 4-11 below.

New Housing Net Capex All figures £m 2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Net Submission	1.2	1.2	1.3	1.3	1.3	6.4
Normalisation Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Normalised Net BPQ	1.2	1.2	1.3	1.3	1.3	6.4
Workload Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Efficiency Adjustment	-0.8	-0.8	-0.8	-0.8	-0.8	-4.0
Total Adjustments	-0.8	-0.8	-0.8	-0.8	-0.8	-4.0
Projected Net	0.5	0.5	0.5	0.5	0.5	2.3

Table 4-7

Existing Housing Net Capex All figures £m 2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Net Submission	6.7	6.9	7.2	7.4	7.5	35.7
Normalisation Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Normalised Net BPQ	6.7	6.9	7.2	7.4	7.5	35.7
Workload Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Efficiency Adjustment	-0.6	-0.8	-1.0	-1.2	-1.3	-5.0
Total Adjustments	-0.6	-0.8	-1.0	-1.2	-1.3	-5.0
Projected Net	6.1	6.1	6.1	6.2	6.2	30.7

Table 4-8

Non-Domestic Net Capex All figures £m 2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Net Submission	1.1	1.0	1.0	0.9	0.9	4.9
Normalisation Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Normalised Net BPQ	1.1	1.0	1.0	0.9	0.9	4.9
Workload Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Efficiency Adjustment	-0.8	-0.8	-0.8	-0.7	-0.7	-3.8
Total Adjustments	-0.8	-0.8	-0.8	-0.7	-0.7	-3.8
Projected Net	0.3	0.2	0.2	0.2	0.2	1.2

Table 4-9

5 MAINS AND GOVERNOR CAPEX

5.1 SUMMARY

Net Capex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission						
Reinforcement Mains	4.8	4.8	5.0	5.0	5.1	**24.7**
District Governors	1.4	1.6	1.6	1.7	1.6	**7.8**
Service Governors	0.2	0.2	0.2	0.2	0.2	**1.1**
Total	**6.3**	**6.6**	**6.9**	**6.9**	**6.9**	**33.6**
Normalisation Adjustments						
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Normalised BPQ						
Reinforcement Mains	4.8	4.8	5.0	5.0	5.1	**24.7**
District Governors	1.4	1.6	1.6	1.7	1.6	**7.8**
Service Governors	0.2	0.2	0.2	0.2	0.2	**1.1**
Total	**6.3**	**6.6**	**6.9**	**6.9**	**6.9**	**33.6**
Adjustments						
Reinforcement Mains	0.1	0.0	-0.3	-0.3	-0.5	**-1.0**
District Governors	0.0	0.0	-0.1	-0.1	-0.1	**-0.3**
Service Governors	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.1**	**0.0**	**-0.4**	**-0.4**	**-0.6**	**-1.3**
Proposed						
Reinforcement Mains	4.9	4.8	4.7	4.7	4.6	**23.7**
District Governors	1.3	1.5	1.6	1.6	1.5	**7.6**
Service Governors	0.2	0.2	0.2	0.2	0.2	**1.0**
Total	**6.4**	**6.6**	**6.5**	**6.5**	**6.3**	**32.3**

Table 5-1

5.2 POLICIES & PROCEDURES

NGN Policies and Procedures associated with reinforcement mains and governors activities have been reviewed as detailed in Appendix 1. The various levels of engineering and safety documents together with the governance arrangements have been reviewed and no issues found.

5.3 HISTORICAL PERFORMANCE

5.3.1 INTRODUCTION

Mains and Governor Capex includes all expenditure associated with reinforcement of the below 7bar distribution network to ensure that transportation capacity is adequate to meet the forecast peak demand. Network reinforcement is substantially driven by general demand growth and the objective of the activity is to ensure that the minimum pressure required at customers' meters is maintained throughout the network. The workload volume is generated from periodic network analysis supported by validation to ensure consistency between modelled and actual pressures.

Governor Capex also includes expenditure associated with governor replacement activities.

5.3.2 DEFINITION OF ACTIVITY

5.3.2.1 Reinforcement Mains

General reinforcement mains activity and expenditure is driven by the following:

- The requirement to ensure that the transportation capacity of the distribution network is adequate to meet the forecast 1:20 peak demand to a 5 year horizon without constraint.
- GDN policy regarding the maximum operating pressure (MOP) of the distribution network and the necessity to ensure that the minimum pressure requirement at customer's meters is maintained throughout the network.
- Up sizing of risk policy replacement mains to compensate for the effects of mains abandonment and replacement of transportation capacity.
- Non-contiguous reinforcement activity associated with customer connection requests.
- General demand growth.

5.3.2.2 Governors

Governor activity and expenditure is driven by the following:

- New district governor installations associated with distribution network reinforcement necessitated by general demand growth.
- Replacement of district governor installations to increase capacity due to demand growth.
- Replacement of district and service governor installations due to obsolescence.
- Failure of district and service governor installations, and the economics of repair versus replacement.
- Replacement of district and service governor installations to ensure compliance with risk mitigation policy requirements and design standards.

5.3.3 ESTABLISH UNDERLYING COSTS

5.3.3.1 Reinforcement Mains

Figure 5-1 shows reinforcement mains expenditure levels for the period 2002/03 to 2006/07.

The reinforcement mains workload in 2002/03 included one major projects (>£0.5m) and substantially resulted from a Transco initiated validation programme in 1999/2000 to validate all low and medium pressure networks.

Expenditure over the period 2005/06 to 2006/07is influenced by the Elswick MP reinforcement project which comprises £1.2m (2.7 km) in 2005/06 and £2.8m (4.9 km) in 2006/07.

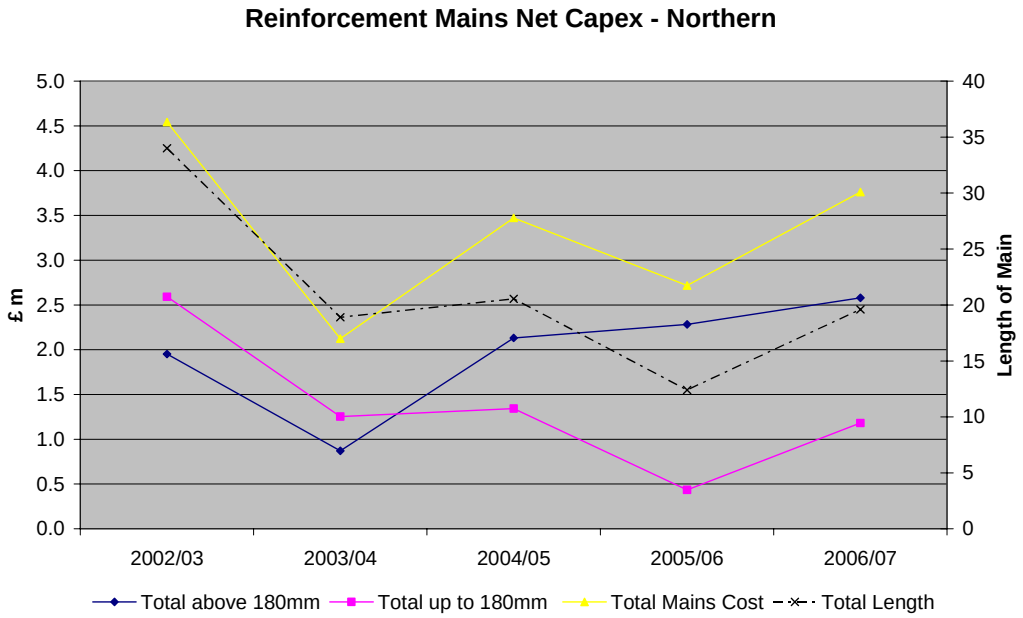

Figure 5-1

Governors - Renewal and Growth

Figure 5-2 shows renewal and growth governor expenditure levels for the period 2002/03 to 2006/07.

Expenditure and workload information reported for 2003/04 is inconsistent and indicates significant errors in allocation.

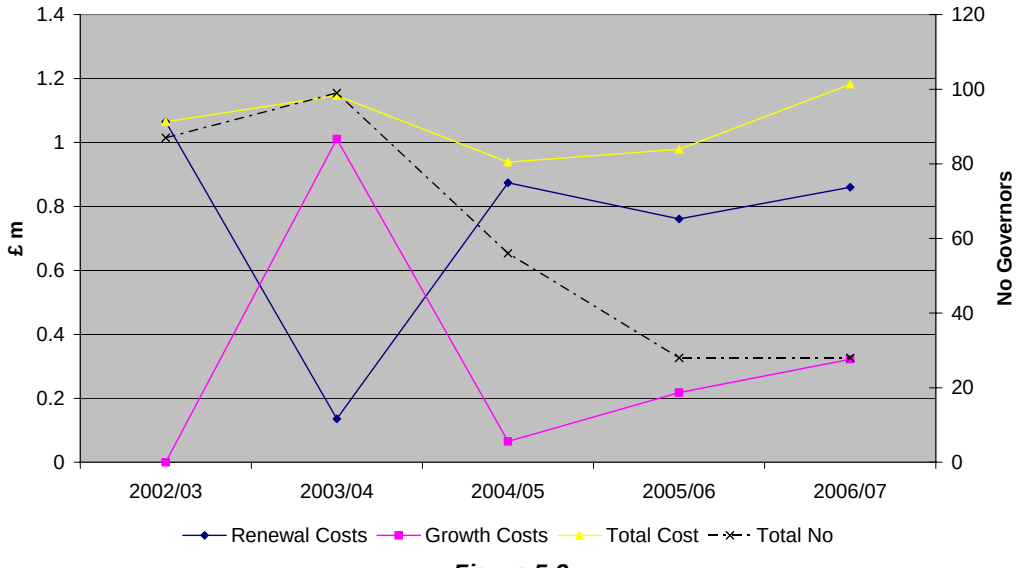

Figure 5-2

5.3.3.2 Governors - Service

Figure 5-3 shows domestic and non- domestic service governor expenditure levels for the period 2002/03 to 2006/07.

Expenditure and workload information reported for the period is inconsistent and indicates significant errors in allocation.

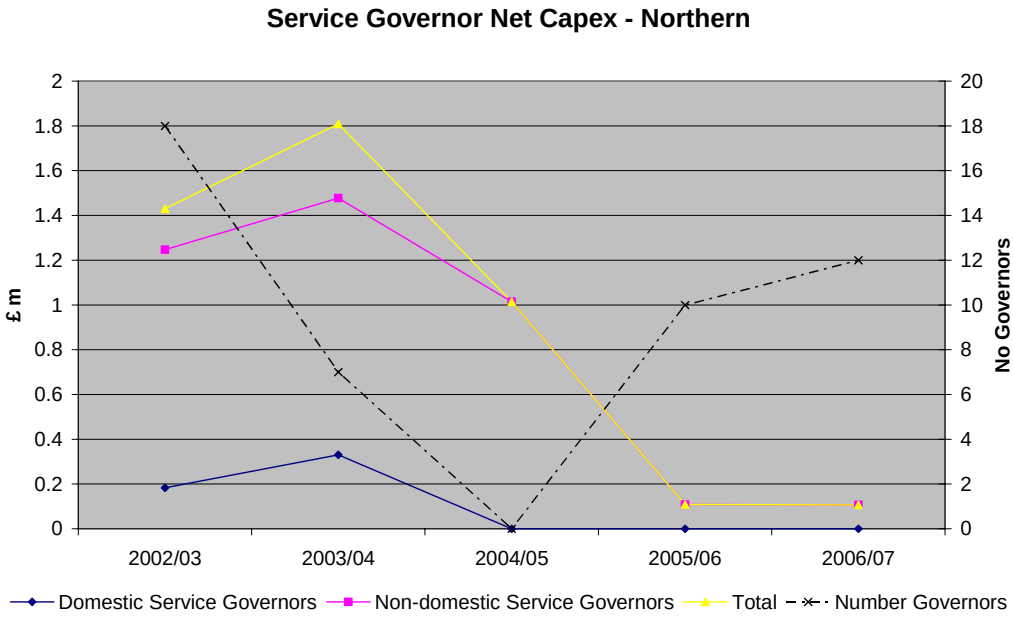

Figure 5-3

5.3.4 PROPOSED EFFICIENT LEVEL OF COSTS

5.3.4.1 Analysis Process

We have developed projections for the efficient level of expenditure required by Northern to carry out its reinforcement and governors activities through benchmarking across GDNs, analysis of their workload assumptions, and review of their forecasts.

No normalisation adjustments have been identified.

No workload adjustments have been identified.

Reinforcement mains activities are separated into two main categories, below and above 180mm pipe size bands. Using 2005/06 as a base year, we have carried out regression analysis for the separate categories and also for total reinforcement mains. The analyses for the separate categories are adversely affected by outlying values and having examined the results we concluded that total reinforcement mains data provided the most robust regression and analysis for the projections. The analysis process is described in detail in Section 2.

NGN has not quantified a level of efficiency improvement for this activity. However, we are of the opinion that there is scope for improvements driven by optimised management of operations and review of period contract arrangements. It is considered that 2% year on year performance improvement is appropriate for this activity, in addition to any progression to the benchmark performance level by underperforming GDNs.

In order to derive our projections for efficient expenditure we have assumed that where a GDN is underperforming the benchmark, the gap with the benchmark will be reduced over the forecast period to 30% by 2012/13. Where a GDN is outperforming the benchmark the projection will be reduced year on year to match the GDN's out performance in 2012/13.

The expenditure projections are adjusted to incorporate Regional Factors and our Standard Real Price Effect assumptions, as specified in Section 2.7.

5.3.4.2 Reinforcement Mains Benchmarking Analysis

A number of regression options have been explored, however, for most activities we have concluded that the most suitable regression is achieved by analysis of the logarithmic values of normalised costs and the chosen driver. A "basket of work" approach has been used to produce a weighted average of a number of different work elements (pipe sizes). The driver is calculated by multiplying the work volume by a nominal unit cost for the activity. The approach is not sensitive to the actual level of these nominal unit costs, but works on the relative costs between work types.

This approach allows the analysis to fully reflect the workload forecast by the GDNs, adjusted for the period 2008/09 to 2012/13 as deemed appropriate by our consultants.

The starting point for setting the target benchmark is an Ordinary Least Squares (OLS) regression on the eight data points, one for each GDN, applicable in the base year (2005/06). The R^2 value indicates how well the variation in costs is explained by the variation in the workload driver.

The OLS regression calculation takes into account all the data points in determining the relationship between the costs and the workload driver. This relationship could be used to determine the frontier costs for each network, but these costs are unlikely to be efficient since generally only some networks will be operating at the efficiency frontier.

We therefore propose to obtain the benchmark cost relationship by adjusting the OLS regression line so that it reflects efficient network performance rather than average performance.

This relationship could be constructed by shifting down the regression line until all the data points are above the line except for one data point which is on the line. This is the Corrected Ordinary Least Squares (COLS) regression line.

However, we consider that there are differences between GDNs which may not be fully explained by the regression analysis and that it is reasonable to set the frontier relationship by shifting the regression line down to the upper quartile. This is the upper quartile COLS regression line and is shown in pink on the charts. This is the target which all under performing GDNs should move towards.

Where the regression uses log-linear analysis, the effect of rejecting the OLS regression line as the frontier relationship in favour of the upper quartile COLS regression line is to reduce the target costs of each network by the same percentage.

With this approach, 75% of networks will be performing at or below the frontier in the base year and these networks will be expected to continue to improve their performance over the period to 2012/13, and our proposed ongoing productivity improvements are set out in Section 5.4.4.1. The resulting target costs for 2012/13 are shown in yellow on the charts.

Figure 5-4 shows the output from benchmarking analysis of 2005/06 cost performance for total reinforcement mains and indicates a very good fit for this activity. The values of cost and synthetic drivers being less than one, lead to the logarithmic values being negative at these values.

Northern's performance ranks 7th best after allowing for regional factors.

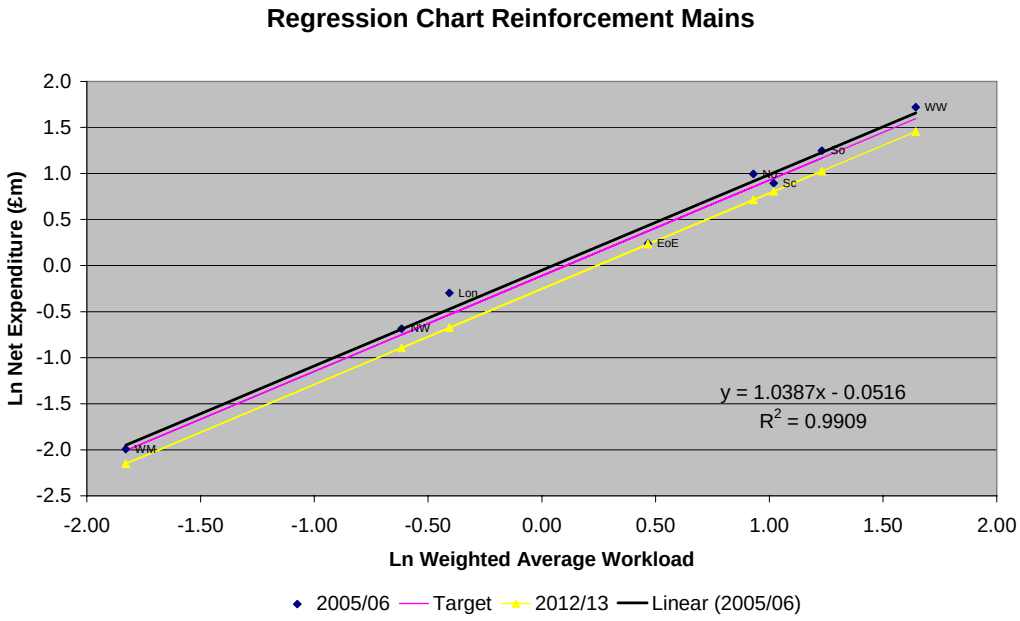

Figure 5-4

5.3.4.3 Governors Analysis

We have examined the BPQ information returned by the GDNs and wide variations in unit costs are evident across all activity categories. Unit cost performance for governor activity categories is significantly influenced by workload volumes, design pressure and capacity, complexity of site installation and cost allocation issues, e.g. costs associated with inlet/outlet mains connections, site security, telemetry, pressure optimisation equipment. We have asked for further information on cost allocations from the GDNs but the responses did not reveal any significant reasons for the unit cost variations.

Governor activities are separated into three main categories, i.e. renewal, growth and service. We have carried out regression analysis for the separate categories and also for total governors. Due to data inconsistencies, the results did not provide a robust basis for our expenditure projections over the forecast period. Therefore, our analysis is based on review of BPQ workload and unit cost projections for the renewal, growth and service governor activity categories taking into account historical and forecast trends, and NGN's assumptions.

Recommended expenditure projections incorporate any adjustments made in the review process, Regional Factors and our Standard Real Price Effect assumptions.

We are of the opinion that governors' operational activities do not provide the opportunity for significant improvements in efficiency. We have therefore applied no efficiency adjustments.

5.4 FORECAST

5.4.1 INTRODUCTION

5.4.1.1 Reinforcement Mains

Northern's forecasts for reinforcement mains incorporate the following activities:

- General reinforcement - Growth

  This activity is driven by the requirement to ensure that the transportation capacity of the distribution network is adequate to meet the forecast 1:20 peak demand to a 5 year horizon taking into account growth in demand.

- Replacement mains upsizing

  A proportion of the reinforcement workload results from upsizing of mains replacement to compensate for the loss of transportation capacity caused by inserting smaller mains. The accounting convention generally operated is such that if a replacement main is greater than 2" larger in diameter, the expenditure is allocated to reinforcement. The replacement mains upsizing workload is driven by the requirement to contain maximum operating pressures and ensure adequate transportation capacity in the distribution system to meet forecast demand.

- Network maximum operating pressures

  NGN has stated that average system pressures have increased year on year and a number of systems are now operating at their maximum operating pressure (MOP). There is, therefore, little opportunity to increase pressures further without affecting safety and integrity of the distribution asset. Workload forecasts include reinforcement to ensure that the minimum pressure requirement at customer's meters is maintained throughout the network. Reinforcement projects examined include evidence that the option of increasing system pressure is considered and the most cost effective solution is adopted.

5.4.1.2 Governors

In assessing the Network's expenditure forecasts for governors we have reviewed the annual workload volumes and unit costs proposed, together with the forecasting processes applied.

NGN's expenditure forecasts for the period 2008/09 to 2012/13 include £2.9m to replace 54 district governor installations due to condition, obsolescence and serviceability.

We are satisfied that the expenditure forecasts for service, renewal and growth governors are reasonable and propose no adjustments.

5.4.2 COMPANY PROPOSALS

5.4.2.1 Reinforcement mains

Key Assumptions

In addition to the generic assumptions for Northern, detailed in Section 2.7, NGN has stated that their reinforcement mains expenditure forecasts also take into account the following assumptions and issues:

- General reinforcement workload volumes are based on historic levels and outputs from recent validation exercises.
- The proportion of larger diameter mains will increase due to increased levels of MP and IP system reinforcement.
- Costs have been estimated using historical data and are based on the current EPC contractor rates.
- Systems currently operating at or near their maximum operating pressure will require reinforcement to contain maximum operating pressures.
- Non-contiguous specific reinforcement generated by customer connections is included in the workload assessments and it is assumed they will be fully funded by the Economic Test.

Workload Forecasts

Figure 5-5 shows the reinforcement mains workload forecasts for Northern.

The lead time for planning for distribution system reinforcement projects is generally 2 to 3 years and is based on network validation exercises. Therefore the workload forecasts for the period 2008/9 to 2012/13 are, substantially, estimates based on the key

assumptions and historical levels. The flat trend profile indicates that detailed planning has not been completed.

The forecasts for >180mm workload are high compared to historical levels which reflects the assumption in this respect.

Northern's LP average system pressures are forecast to increase from 32.5 mbar in 2005/06 to 33.5 mbar in 2012/13. Sample reinforcement projects examined include evidence that the option of increasing system pressure is considered and the least cost solution is adopted.

Northern's reinforcement mains workload forecasts include 1km per year associated with replacement mains upsizing. This level of activity is low compared to other GDNs but NGN has confirmed that the forecast is accurate.

We recommend that the workload forecasts are accepted.

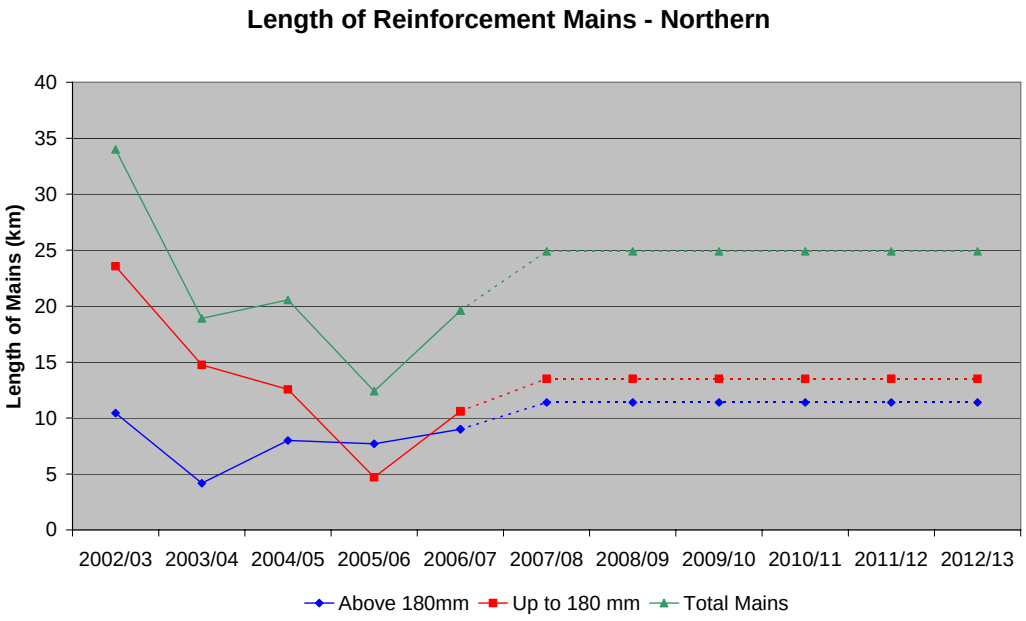

Figure 5-5

5.4.2.2 Governors

Key Assumptions

In addition to the generic assumptions for Northern, detailed in Section 2.7, NGN has stated that their governors expenditure forecasts also take into account the following assumptions and issues:

- Costs are based on historical data.
- Renewal workload volumes are based on historical data, asset condition, age profiles, fault analysis and analysis of obsolete parts.
- Growth workload volumes are based on historical data and network analysis.
- Domestic and non-domestic service governor workload volumes are based on asset condition and age profiles.

Workload Forecasts

Figures 5-6 and 5.7 show the governor workload forecasts for Northern.

The governors workload forecasts have been considered taking into account historical trends and NGN's assumptions.

We have considered whether to reduce the forecast growth workload volumes which do not follow the historical trend level. However, the forecasts are aligned with increased reinforcement activity and we have concluded that no adjustment should be made.

We recommend that the workload forecasts are accepted.

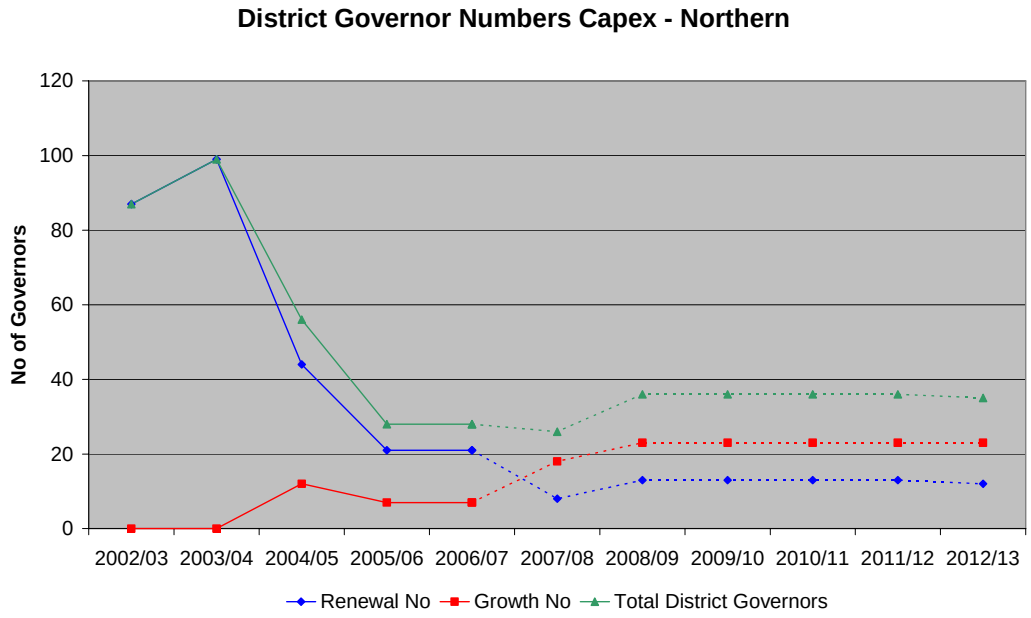

Figure 5-6

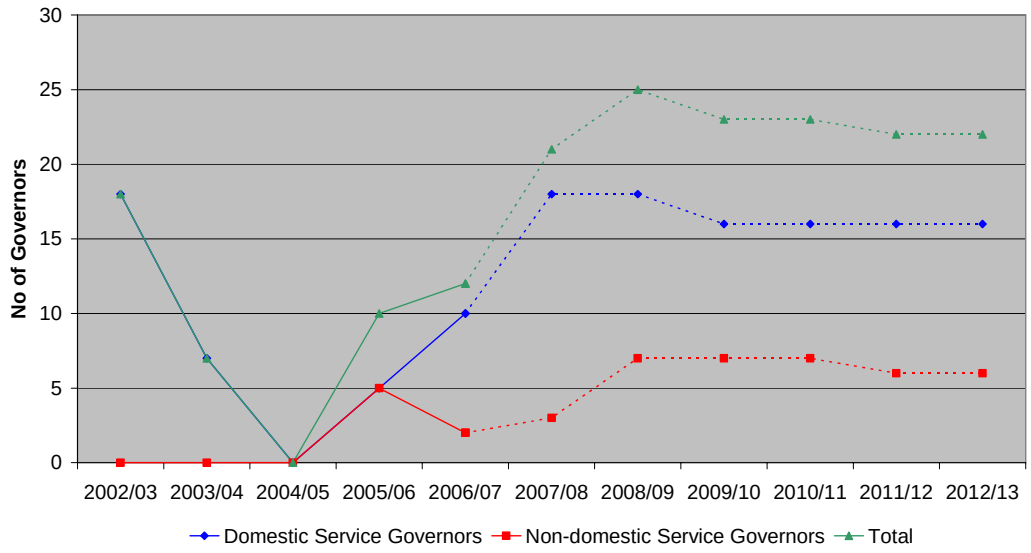

Figure 5-7

5.4.3 PB POWER PROPOSALS

5.4.3.1 Reinforcement mains

Figure 5-8 shows Northern's expenditure projections for the total reinforcement mains activity over the period 2005/06 to 2012/13.

The recommended expenditure projection reflects closing the gap with the target performance to 30% at 2012/13.

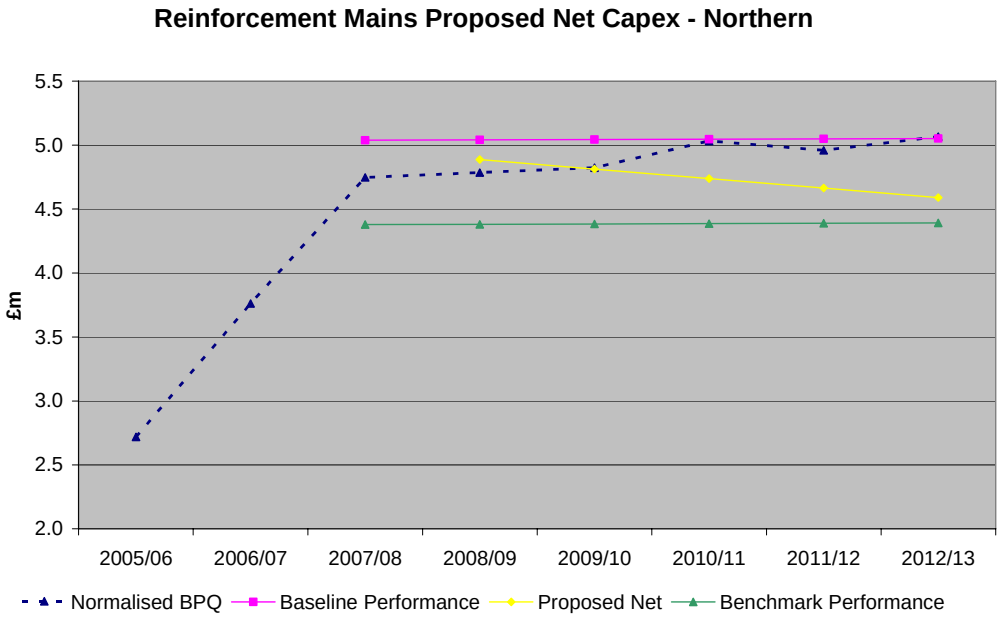

Figure 5-8

5.4.3.2 Governors

The governors cost projections for the forecast period have been assessed by review of BPQ workload and unit cost forecasts for the renewal, growth and service governor activity categories taking into account historical trends and NGN's assumptions. No adjustments have been made to Northern's workload forecasts.

Figures 5-9 and 5.10 show the expenditure projections for governors activities over the period 2005/06 to 2012/13.

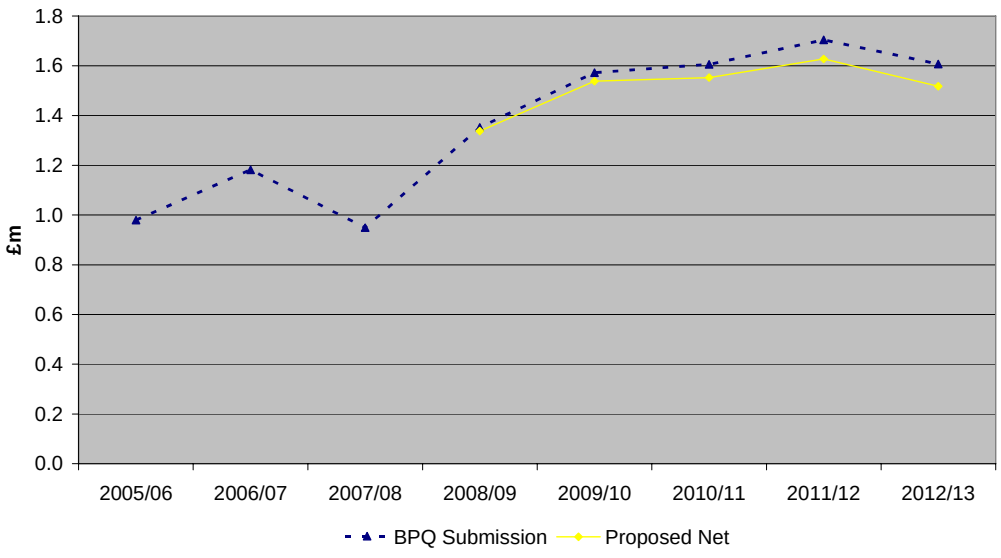

Figure 5-9

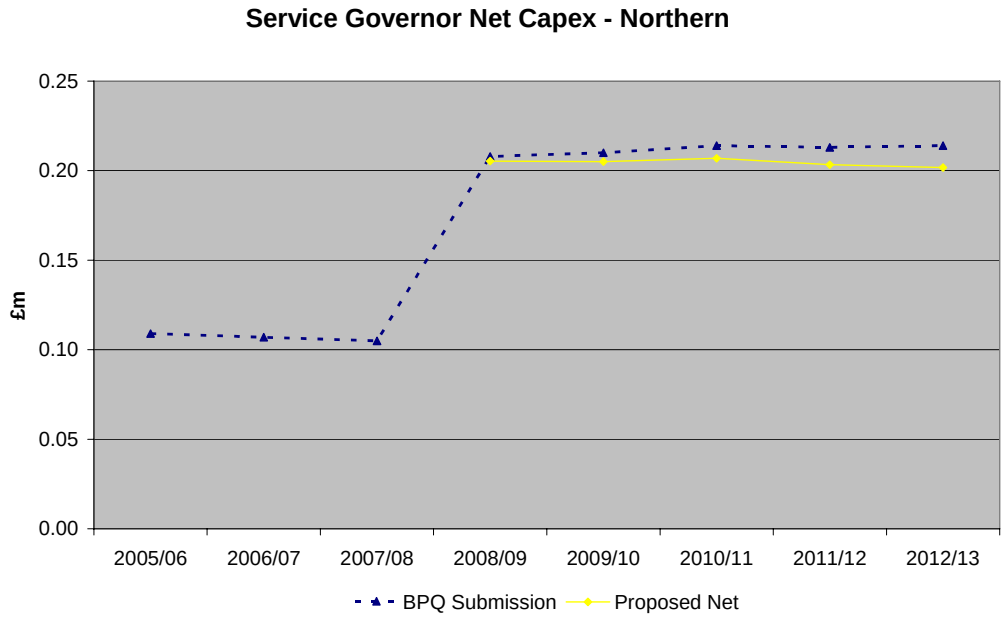

Figure 5-10

5.4.4 SPECIFIC COST AREAS

5.4.4.1 Efficiency Improvements

NGN has not quantified a level of efficiency improvement for reinforcement mains. However, we are of the opinion that there is scope for improvement driven by optimised management of operations and review of period contract arrangements. It is considered that 2% year on year performance improvement is appropriate for this activity.

5.4.4.2 Waste Management Regulations

The EU Landfill Directive is setting tighter standards on wastes that can go to landfill. Following recent changes in Regulations (July 2005) to bring England and Wales in line with the Directive, it is expected that more waste will be classified as “non-hazardous” rather than “inert” as at present. The standard Landfill Tax charge is currently £21/tonne for non-hazardous waste, with a lower rate of £2/tonne charged for inert waste. The Government has stated that the standard rate for non-hazardous waste will increase by at least £3 annually to a rate of £35 in 2010.

We acknowledge that the changes to the Regulations will generate additional costs but we judge that GDNs are able to mitigate these by improving the management and scope of operational practices such as minimisation of excavation, re-use of materials, recycling, conditioning and materials testing to establish inert status.

The effect of the increased tax charge has been assessed and we have concluded that the resulting additional expenditure associated with Capex operations is minimal and, therefore, no adjustment has been made to our expenditure projections. However, we recognise that there is uncertainty regarding the cost implications of these Regulations and recommend that the GDN be required to model the costs, based on our workload projections, for further consideration.

5.4.5 REAL PRICE EFFECTS

The recommended cost projections presented in Section 5.4.6 incorporate our real price effect assumptions, as detailed in Section 2.7.

5.4.6 RECOMMENDATIONS

5.4.6.1 Workload

We recommend that the Northern BPQ workload forecasts for reinforcement mains and governors activities are accepted, as summarised in Tables 5.2, 5.3 and 5.4.

Reinforcement Mains Length (km)	2008/09	2009/10	2010/11	2011/12	2012/13
BPQ					
<180mm	13.5	13.5	13.5	13.5	13.5
>180mm	11.4	11.4	11.4	11.4	11.4
	24.9	24.9	24.9	24.9	24.9
Normalisation Adjustments					
<180mm	0.0	0.0	0.0	0.0	0.0
>180mm	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0
BPQ					
<180mm	13.5	13.5	13.5	13.5	13.5
>180mm	11.4	11.4	11.4	11.4	11.4
Total	24.9	24.9	24.9	24.9	24.9
Work Load Adjustments					
<180mm	0.0	0.0	0.0	0.0	0.0
>180mm	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0
Projected					
<180mm	13.5	13.5	13.5	13.5	13.5
>180mm	11.4	11.4	11.4	11.4	11.4
Total	24.9	24.9	24.9	24.9	24.9

Table 5-2

Number District Governors	2008/09	2009/10	2010/11	2011/12	2012/13
PBQ Workload					
Growth	23.0	23.0	23.0	23.0	23.0
Renewal	13.0	13.0	13.0	13.0	12.0
Total	36.0	36.0	36.0	36.0	35.0
Work Load Adjustments					
Growth	0.0	0.0	0.0	0.0	0.0
Renewal	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0
Projected Workload					
Growth	23.0	23.0	23.0	23.0	23.0
Renewal	13.0	13.0	13.0	13.0	12.0
Total	36.0	36.0	36.0	36.0	35.0

Table 5-3

Number Service Governors	2008/09	2009/10	2010/11	2011/12	2012/13
BPQ Workload					
Domestic	18.0	16.0	16.0	16.0	16.0
Non-Domestic	7.0	7.0	7.0	6.0	6.0
Total	25.0	23.0	23.0	22.0	22.0
Work Load Adjustments					
Domestic	0.0	0.0	0.0	0.0	0.0
Non-Domestic	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0
Projected Workload					
Domestic	18.0	16.0	16.0	16.0	16.0
Non-Domestic	7.0	7.0	7.0	6.0	6.0
Total	25.0	23.0	23.0	22.0	22.0

Table 5-4

5.4.6.2 Expenditure

Tables 5-5, 5.6 and 5.7 summarise our net expenditure projections.

Reinforcement Mains Net Capex All figures £m 2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Net Submission	4.8	4.8	5.0	5.0	5.1	24.7
Normalisation Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Normalised Net BPQ	4.8	4.8	5.0	5.0	5.1	24.7
Total up to 180mm	1.5	1.5	1.5	1.5	1.5	7.4
Total above 180mm	3.3	3.4	3.5	3.5	3.6	17.3
Total Adjustments	0.1	0.0	-0.3	-0.3	-0.5	-1.0
Workload Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Efficiency Adjustment	0.1	0.0	-0.3	-0.3	-0.5	-1.0
Proposed Net	4.9	4.8	4.7	4.7	4.6	23.7
Total up to 180mm	1.8	1.8	1.7	1.7	1.7	8.7
Total above 180mm	3.1	3.1	3.0	3.0	2.9	15.0

Table 5-5

District Governor Net Capex All figures £m 2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Net Submission	1.4	1.6	1.6	1.7	1.6	7.8
Normalisation Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Normalised Net BPQ	1.4	1.6	1.6	1.7	1.6	7.8
Growth	0.8	0.9	1.0	1.1	1.1	4.9
Renewal	0.5	0.6	0.6	0.6	0.5	3.0
Total Adjustments	0.0	0.0	-0.1	-0.1	-0.1	-0.3
Workload Adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Efficiency Adjustment	0.0	0.0	-0.1	-0.1	-0.1	-0.3
Disallowed Costs	0.0	0.0	0.0	0.0	0.0	0.0
Proposed Net	1.3	1.5	1.6	1.6	1.5	7.6
Growth	0.8	0.9	0.9	1.0	1.0	4.7
Renewal	0.5	0.6	0.6	0.6	0.5	2.9

Table 5-6

Service Governor Net Capex All figures £m 2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ	0.2	0.2	0.2	0.2	0.2	1.1
Domestic	0.0	0.0	0.0	0.0	0.0	0.0
Non-Domestic	0.2	0.2	0.2	0.2	0.2	1.1
Total Adjustments	0.0	0.0	0.0	0.0	0.0	0.0
Proposed Net	0.2	0.2	0.2	0.2	0.2	1.0
Domestic	0.0	0.0	0.0	0.0	0.0	0.0
Non-Domestic	0.2	0.2	0.2	0.2	0.2	1.0

Table 5-7

6 OTHER OPERATIONAL CAPEX

6.1 SUMMARY

Net Capex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission						
Plant & Equipment	6.5	4.2	3.6	3.7	3.2	**21.1**
Land & Buildings	1.1	1.2	1.2	1.2	1.2	**5.8**
Total	**7.6**	**5.3**	**4.8**	**4.8**	**4.3**	**26.9**
Normalisation Adjustments						
Plant & Equipment	-0.2	-0.1	-0.1	-0.1	-0.1	**-0.6**
Total	**-0.2**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.6**
Normalised BPQ						
Plant & Equipment	6.3	4.1	3.5	3.6	3.1	**20.5**
Land & Buildings	1.1	1.2	1.2	1.2	1.2	**5.8**
Total	**7.4**	**5.2**	**4.7**	**4.7**	**4.2**	**26.3**
Adjustments						
Plant & Equipment	0.0	-0.1	-0.1	-0.2	-0.2	**-0.5**
Land & Buildings	-0.7	-0.8	-0.9	-1.0	-1.0	**-4.4**
Total	**-0.7**	**-0.9**	**-1.0**	**-1.1**	**-1.1**	**-5.0**
Proposed						
Plant & Equipment	6.2	4.0	3.4	3.4	2.9	**20.0**
Land & Buildings	0.4	0.3	0.2	0.2	0.2	**1.4**
Total	**6.7**	**4.3**	**3.6**	**3.6**	**3.1**	**21.3**

Table 6-1

6.2 POLICIES & PROCEDURES

6.2.1 INTRODUCTION

6.2.1.1 Land and Buildings

There are no specific policies or procedures relating to this area. However, the procurement or disposal of such assets is covered by NGN's financial procedures. NGN holds the freeholds for its operational sites (which are not covered by easements or wayleaves). The Network's other sites such as offices, depots, and stores are predominantly leased and there is no stated intention to move away from this position.

6.2.1.2 Plant and Equipment

NGN has stated that its policy in relation to [the procurement of new] plant and equipment is based on safety, age, condition and legislation, taking into account new technology and new techniques.

6.2.2 EFFICIENCY AND PRODUCTIVITY

6.2.2.1 Land and Buildings

The procurement of operational sites will normally be included in the appropriate Capex project authorisation process. Rates paid for such sites may often have a 'ransom' element which is unavoidable except by following a compulsory purchase order which

takes too long and would add other delay costs to the projects. The optimum project solution would only be changed if this element becomes material.

Procurement of other sites is normally on an open market basis and therefore optimum solutions can usually be attained.

This section in NGN's submission includes a request for expenditure on the (chemical) decontamination of ex gas works sites. Some decontamination work is driven by land disposal economics and some by environmental controls (contamination which is migrating or might migrate outside the site boundary).

6.2.2.2 Plant and Equipment

The efficiency with which plant and equipment is procured is commensurate with NGN's overall procurement policies and procedures.

Investment in new plant and equipment however has a direct bearing on the productivity and efficiency of the work areas for which it is provided. Therefore a reasonable and sustained level of investment is to be expected to support productivity improvements in these activities.

6.3 HISTORICAL PERFORMANCE

6.3.1 INTRODUCTION

6.3.1.1 Land and Buildings

Historical expenditure of Capex on land and buildings has been low and variable and (excluding proposals for decontamination, please see below), NGN's proposals continue to be low.

6.3.1.2 Plant and Equipment

The pre-sale levels of expenditure were low compared with NGN's proposals for this review period. The Network has proposed a fully detailed investment programme for the next period, although it is higher than recent historical expenditure.

6.3.2 DEFINITION OF ACTIVITY

6.3.2.1 Land and Buildings

This activity covers the procurement of freeholds for non-operational sites and capitalised upgrades to leased premises which are not funded by the landlord (e.g. adding air conditioning, building a security fence etc.).

6.3.2.2 Plant and Equipment

This activity includes the procurement of aggregate recycling equipment, gas conditioning and pressure control equipment, pipe bridges, wheeled plant, VESAS, valve remediation and other operational plant and equipment.

6.3.3 ESTABLISH UNDERLYING COSTS

6.3.3.1 Land and Buildings

Net Capex £m All figures in 2005/06 Prices	2002/03	2003/04	2004/05	2005/06	2006/07
Land & Buildings	0.0	0.0	0.4	0.0	0.0

Table 6-2

These costs represent one-off periodic expenditure only, indicating that there is no historical trend, other than 'low'.

6.3.3.2 Plant and Equipment

Net Capex £m All figures in 2005/06 Prices	2002/03	2003/04	2004/05	2005/06	2006/07
Plant & Equipment	0.0	0.3	0.2	0.1	1.6

Table 6-3

This demonstrates a modest spend up to the time of the GDN sale and a material uplift after that date.

6.4 FORECAST

6.4.1 COMPANY PROPOSALS

6.4.1.1 Land and Buildings

NGN has indicated a proposed a spend of £ 5.8m for the review period, of which £4.4m is for land remediation.

The Network proposes remediation to 15% of all its contaminated sites in the five year period. There is no evidence available for most of these sites at the time of this report to justify this spend. Legislation requires the containment of pollutants and only if migration off site actually occurs or there is the threat of imminent migration will there be a statutory requirement to act. This was Transco/NGG's pre-sale policy and it required much lower levels of expenditure than those proposed by NGN.

However, even if the Network is required to undertake this (statutory) work there should be no Capex costs incurred. We believe that costs relating to statutory decontamination had been treated as an exceptional charge to the profit and loss account and therefore there would not be any Opex cost either, except in relation to the unwinding of the provision.

[Ofgem is still considering this financial treatment and will clarify the position before the final allowances are determined for this review period.]

Any expenditure associated with non statutory decontamination would be set against the proceeds of sale. As a sale would only be considered if there were a net profit to be made, then there is no (net) Capex element to such work.

Net Capex £m All figures in 2005/06 Prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Land & Buildings	1.1	1.2	1.2	1.2	1.2	5.8

Table 6-4

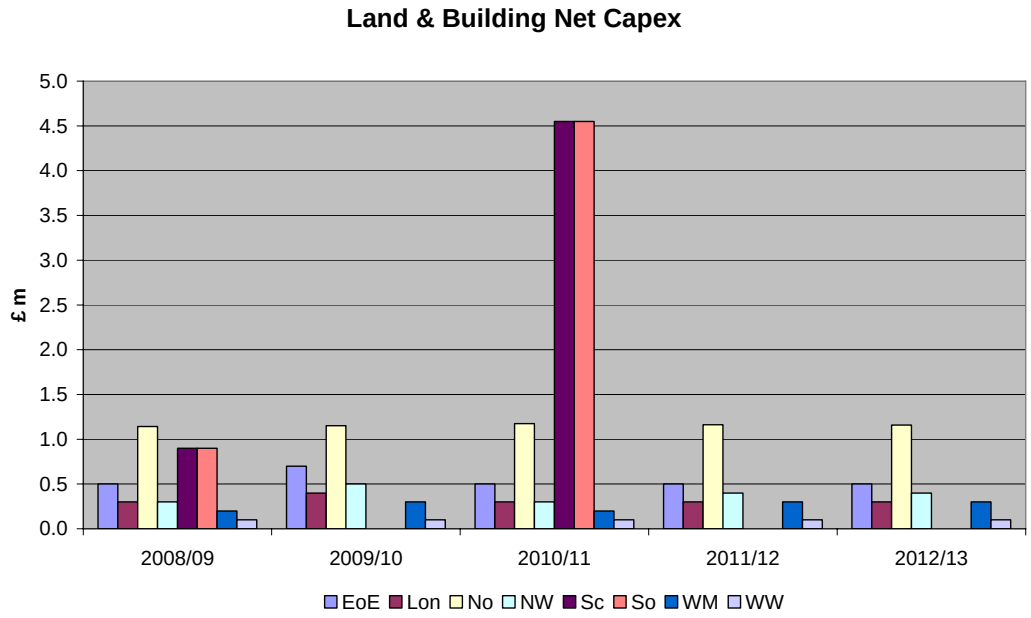

Figure 6-1

6.4.1.2 Plant and Equipment

NGN has proposed an expenditure of c. £4m per year on average for the five year period. This is detailed in the submission and covers a wide range of subcategories.

It is to be expected that a new owner will review the inherited plant and equipment assets and determine an investment strategy to upgrade these to better serve his workforce and ensure optimum productivity.

NGN had included here some expenditure on gasholder handrails, which should be located in LTS Storage. This has been transferred and is reflected in Table 6-5.

Net Capex £m All figures in 2005/06 Prices	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Plant & Equipment						
BPQ	6.5	4.2	3.6	3.7	3.2	21.1
Normalised Adjustment	-0.2	-0.1	-0.1	-0.1	-0.1	-0.6
Normalised BPQ	6.3	4.1	3.5	3.6	3.1	20.5

Table 6-5

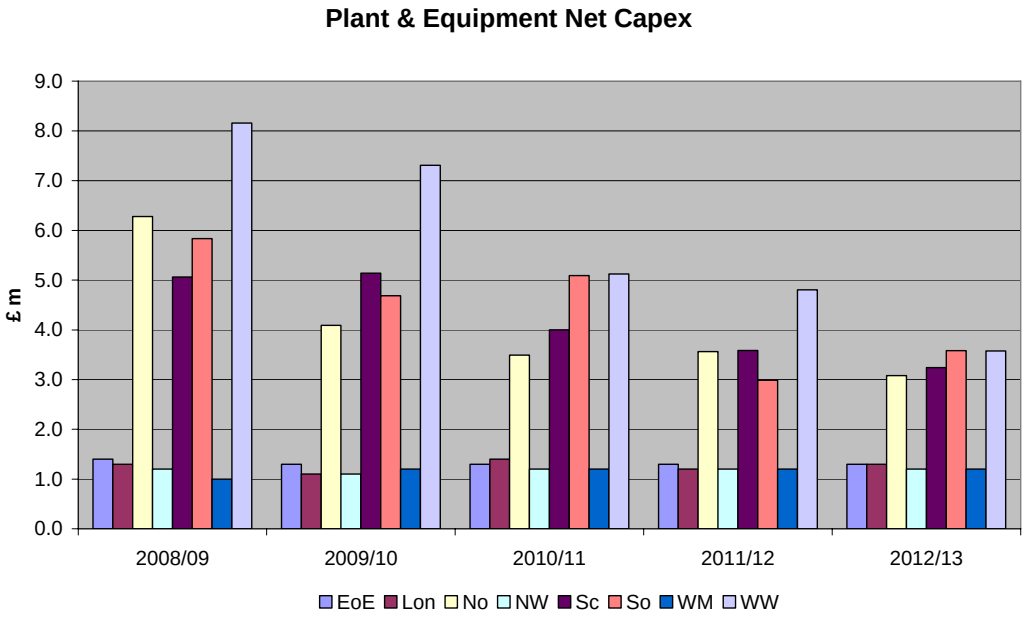

Figure 6-2

6.4.2 SPECIFIC COST AREAS

6.4.2.1 Land and Buildings

As stated above, the decontamination programme proposed by NGN for the five year period is said to provide for statutory works only; however there are only two named sites which have been identified now as needing such work.

NGN has stated they have employed an environmental expert to advise on the condition of these 48 sites and we are unable at this date to confirm whether this will demonstrate a statutory need to spend money on some or all these sites. If the expert report is available before determination of the final allowances for the review period, agreement could be reached on an acceptable programme and commensurate level of efficient expenditure. [Ofgem will determine the financial treatment of any agreed expenditure – see 1.4.1.1 above.]

We believe that non statutory costs should be borne by the proceeds of sale. If there isn't a net profit to be made and the pollution is currently contained within the site boundary, why would the land be sold?

As also stated above, we believe that the costs of statutory work should not reflect in the Capex account.

6.4.2.2 Plant and Equipment

A detailed listing of proposed work was provided. The major areas for proposed spend relate to aggregate recycling equipment , pipe bridges and operational equipment such as waterbath heaters, valves, slamshuts and gasholders.

6.4.3 RECOMMENDATIONS

6.4.3.1 Land and Buildings

In considering the appropriate level to set the target maximum level of expenditure, we have discounted the GDN with the lowest proposed spend over the period as this in our view is not sustainable for the other GDNs.

We have therefore in this case taken the upper quartile performance of the remaining 7 GDNs and this gives a target maximum spend over the period of £1.5m.

We are recommending exclusion at this stage of all the requested expenditure on decontamination for the reasons stated in 6.4.2.1 above

The residual submission of £1.4m over the period, for building work as described is considered to be commensurate with NGN's property portfolio and it is therefore proposed that this be allowed in full.

6.4.3.2 Plant and Equipment

The Plant and Equipment section comprises of a wide set of activities and not all GDNs have requested monies against all activities.

However, NGN has provided a fully detailed listing of the proposed work. We agree with the justifications for this work and deem it necessary.

It is therefore proposed that after adjustment for real price effects, the requested expenditure is allowed in full.

7 NON-OPERATIONAL CAPEX

7.1 SUMMARY

GDN Capital Expenditure £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	5 Yr Total
System Operations	5.9	2.7	1.9	1.9	2.1	14.5
IS Infrastructure	1.7	0.5	2.5	6.3	0.8	11.8
IS Systems	11.0	11.3	2.5	0.0	0.0	24.8
xoserve Capex	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles	4.4	1.3	0.4	3.2	4.7	14.0
Telecoms, Office	0.1	0.1	0.1	0.1	0.1	0.3
Security	0.4	0.4	0.4	0.4	0.4	2.1
Furniture and fittings	0.3	0.3	0.3	0.3	0.3	1.3
Tools & Equipment	0.7	0.7	0.8	0.8	0.7	3.7
Other	0.0	0.0	0.0	0.0	0.0	0.0
Total	24.5	17.3	8.8	12.9	9.1	72.5
Normalisation Adjustments						
System Operations	2.4	1.9	0.2	0.0	0.0	4.5
IS Systems	-2.4	-1.9	-0.2	0.0	0.0	-4.5
xoserve Capex	1.9	0.1	2.0	1.6	0.1	5.7
Net Total	1.9	0.1	2.0	1.6	0.1	5.7
Normalised Capex						
System Operations	8.3	4.6	2.1	1.9	2.1	19.0
IS Infrastructure	1.7	0.5	2.5	6.3	0.8	11.8
IS Systems	8.6	9.4	2.3	0.0	0.0	20.3
xoserve Capex	1.9	0.1	2.0	1.6	0.1	5.7
Vehicles	4.4	1.3	0.4	3.2	4.7	14.0
Telecoms, Office	0.1	0.1	0.1	0.1	0.1	0.3
Security	0.4	0.4	0.4	0.4	0.4	2.1
Furniture and fittings	0.3	0.3	0.3	0.3	0.3	1.3
Tools & Equipment	0.7	0.7	0.8	0.8	0.7	3.7
Other	0.0	0.0	0.0	0.0	0.0	0.0
Total	26.3	17.5	10.8	14.5	9.3	78.3
Efficiency Adjustments						
System Operations	-5.2	-2.7	0.3	0.8	0.0	-6.8
Net Total	-5.2	-2.7	0.3	0.8	0.0	-6.8
Proposed Net Capex						
System Operations	3.2	1.9	2.4	2.7	2.1	12.3
IS Infrastructure	1.7	0.5	2.5	6.3	0.8	11.8
IS Systems	8.6	9.4	2.3	0.0	0.0	20.3
xoserve Capex	1.9	0.1	2.0	1.6	0.1	5.7
Vehicles	4.4	1.3	0.4	3.2	4.7	14.0
Telecoms, Office	0.1	0.1	0.1	0.1	0.1	0.3
Security	0.4	0.4	0.4	0.4	0.4	2.1
Furniture and fittings	0.3	0.3	0.3	0.3	0.3	1.3
Tools & Equipment	0.7	0.7	0.8	0.8	0.7	3.7
Other	0.0	0.0	0.0	0.0	0.0	0.0
Total Proposed	21.2	14.7	11.1	15.2	9.3	71.5

Table 7-1

Non-Operational Capex includes various activities. These are discussed under each of the headings shown below, as appropriate, in this section.

- System Operations
- IS Costs, which includes IS Systems and IS Infrastructure Costs
- xoserve
- Vehicles costs
- Other, which comprises the remaining Non-Operational Capex items (Telecoms & Office, Security, Furniture and fittings, Tools & Equipment as well as a designated Other)

NGN's total Non-Operational Capex spend is third highest compared with the other GDNs as shown below in Figure 7-1

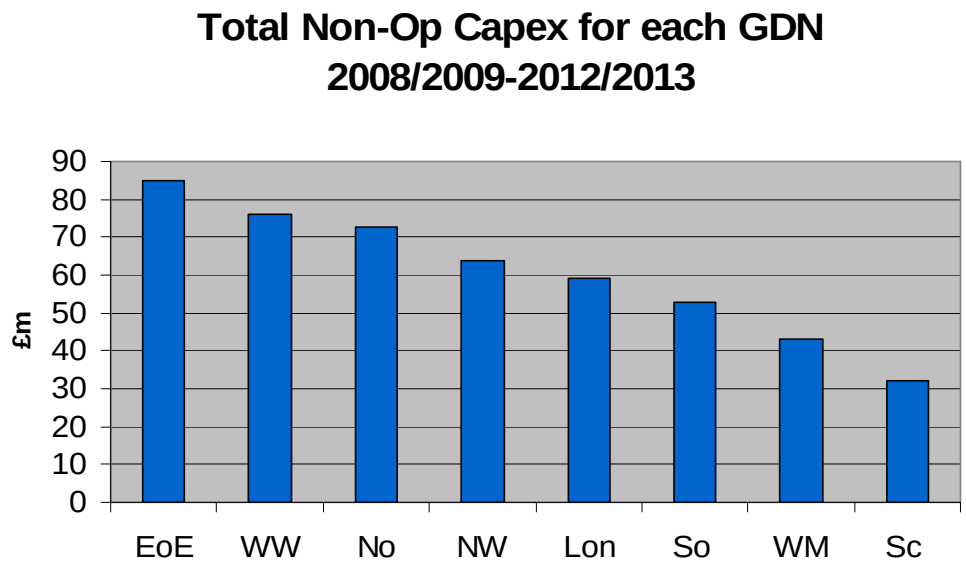

Figure 7-1

7.2 BACKGROUND

7.2.1 INTRODUCTION

This section reviews the relevant background to the operations covered under Non-Operational Capex.

7.2.1.1 System Operation

The DNCS programme

The Gas Transportation Management System (GTMS) is the Supervisory Control & Data Acquisition (SCADA) System effecting operational control over all UK Distribution Networks. All GDNs are currently operated, by National Grid Gas (NGG) at Hinckley, under the System Operation Managed Service Agreement (SOMSA).

GTMS is old technology and has been enhanced by NGG since its inception in the mid 1980s; it has been in its current form since 1996. NGG completed an assessment of the system establishing its longevity at no later than 2009; the major issues are spares and an unsupported operating System.

With this in mind NGG embarked upon a course of action to replace the system and to keep it effective until the decommissioning date; respectively known as the Distribution National Control System (DNCS) and Prolonged Active Life (PAL) projects. The decision to replace GTMS was taken in autumn 2005 with support from all GDNs to collaboratively undertake the job. The GDNs supported the reasoning that this was the most appropriate technical option for the industry, cost effective and would allow a phased exit from SOMSA, once delivered to NGG, within a timeframe to suit all 4 GDNs. Specification work was undertaken and a contract awarded to a consortium led by Serck controls.

NGG has entered into a formal collaboration agreement with NGN, SGN and WWU to jointly replace the existing GTMS control system with this new Serck control system and for it to be deployed into NGG's Control Centre at Hinckley. The new control system is being designed to have the same operating functionality as the GTMS, although its architecture will be developed such that its operating structure is aligned to individual GDNs to facilitate transfer and so ease SOMSA exit. It is planned to complete GTMS replacement and deploy the new system into NGG in summer 2008. This constitutes Phase 1 of the project. The costs for Phase 1 have been agreed with Serck and a sharing arrangement for these costs has been agreed between the GDNs.

Phase 2 of the project is the implementation (essentially, a replication) of the system into the GDNs to enable them to exit SOMSA and take over operational control for themselves. Each GDN is responsible for its own costs in delivering the systems into its own business and is contracting separately with Serck for this part of the project.

Ofgem granted NGN a 'Relinquishment of Operational Control' for a finite period; SOMSA expires 31 March 2008 with any extensions needing regulatory agreement. However, the nature of the collaboration project (DNCS) is such that exit of SOMSA by any Network during the construction phase would not be possible due to the demands on NGG staff, Management and contractors engaged in the construction. Presently NGN has outline timeline for transfer of responsibilities from NGG. With plans in place for exit from SOMSA as late summer 2008; there are no detailed transfer plans in place with NGG at the time of writing. NGN, jointly with NGG, SGN and WWU are working to identify and understand the exact extent of the activities that would have to be completed by NGG and NGN to allow transfer of operations to proceed smoothly.

PB Power believes that the collaborative project to replace the GTMS is the most efficient solution for the industry. There are several reasons for this

1. The collaborative project reduces the time in which a system can be constructed; 4 individual systems for 3 exiting GDNS would call on the same NGG control and IS staff for assistance resulting in a pinch point in any program. These staff would also be working on the NGG variant of the System.
2. The sorting of the System into the correct components for exit whilst constructing a new system is viewed as cost effective. Serck only need to construct one system & slice it appropriately instead of up to potentially 4 contractors constructing 4 different Systems. The GDNs then benefit from an initially aligned system capable of future individual development.
3. Collaboration allows for a phased agreed exit from SOMSA.

7.2.1.2 IS Capex

IS Costs include IS Systems and IS Infrastructure (essentially software and hardware respectively). PB Power has reviewed the IS Capex expenditure with a view to confirming that the planned projects are appropriate and categorising which projects might be expected to yield productivity (Opex) savings over the longer term. Further work is being carried out on whether levels of expenditure are appropriate for IS projects. As a result no adjustments have currently been made in this report.

7.2.1.3 xoserve

xoserve is a separate business which started trading on 1 May 2005 as a wholly owned subsidiary of National Grid Group. On 1 June 2005 it became multi-owned by the GDNs and National Grid UK Transmission. The shareholding is split amongst National Grid NTS (11%) and all the GDN's in proportion to the number of supply points in March 2005.

xoserve provides transactional services primarily through UK LINK, as well as IS Support and Change Management to the GDNs under an Agency Services Agreement (ASA).

xoserve is planning a series of significant capital development projects in the next period, including a rewrite of UK-LINK.

PB Power understands that xoserve is now proposing to recover the cost of capital expenditure from the GDNs in the year in which it is incurred. To date the GDNs have treated xoserve charges as Opex – although some (NG and WWU) have submitted elements of Capex in their forecast costs. PB Power are therefore reviewing and, where necessary, adjusting the Opex/Capex split for each DN.

NGN has submitted a significant level of xoserve Opex, and zero Capex.

xoserve cost forecasts and the scope of development work they will undertake in the next period are the subject of an ongoing industry discussion workgroup.

xoserve is jointly owned by the GDNs, although National Grid is not able to exercise voting power proportionate to its total shareholding. The work programme is determined through industry consultation and in response to customer requirements.

xoserve states in its BPQ submission that it plans to deliver 3% annual savings on direct operating costs (salaries, pensions, agency staff costs, travel and subsistence) offset by real earnings growth of 2% for directly employed staff.

xoserve procures significant levels of bought-in services, including IS Support services, from National Grid. As a result many of its costs have been subject to competitive purchase through National Grid's procurement processes.

However, xoserve makes regular full value-for-money reviews of all of its bought-in services to ensure that its provision continues to be cost effective and efficient in the market place. In general, xoserve benefits significantly from National Grids purchasing power.

7.2.1.4 Vehicles

With regard to Vehicles, NGN has stated (NGN122) that they believe it is more economic to purchase vehicles outright, because of the way in which leases are treated in its accounts (i.e. as borrowings on which interest is payable). They also believe that leasing leads to inefficiency, typically in maintenance spend, and choose to procure a one badge fleet to minimize maintenance costs on an ongoing basis.

NGN has a fleet of 609 vehicles, as at 26 July 2006, acquired from NG on lease arrangements at Network Sale.

NGN's describe their replacement programme as 'Best Practice' and schedule as follows:

- LGV, CDV's: replaced on 5 year cycle at 15,000 miles/year
- LGV Panel Vans: 6 years at 15,000 miles/year
- HGV's: 8 years at 15,000 miles/year

NGN use a selected service provider which takes advantage known as 'Selectus Online' which provides the opportunity to obtain significant discounts of over 30% for CDVs and panel vans with onboard electronics. These discounts are incorporated into the submitted BPQ costs.

The service provider was chosen after a full lease v buy appraisal. NGN approached three major providers in testing the commerciality of the Selectus Online offering. The providers were all trading divisions of NGN's key relationship banks, to ensure that the offering was compared to a full competitive tender. The discounts described above were instrumental in the final choice of supplier.

NGN states (NGN122) that it works closely with their service provider to advise of optimal disposal times per vehicle.

Although the service provider contract was not subject to full competitive tender, NGN did test the commerciality of the offering.

Since taking over the network in June 2005, NGN has procured minimal vehicles whilst it has evaluated the fleet position, taken steps to remove high maintenance vehicles from the fleet and deferred replacement to take advantage of the peppercorn rents on the secondary leases and minimise capital expenditure. The fleet has an average age of 4.9 years at 2006.

7.2.1.5 Other

Other costs in the Non-Operational Capex category include Telecoms & Office, Security, Furniture and fittings, Tools & Equipment and Other. PB Power has made inter-GDN comparisons of these costs.

7.3 HISTORICAL PERFORMANCE

7.3.1 INTRODUCTION

The following table shows NGN's performance in Non-Operational Capex in the previous period (NB: 5 years to end 2006/07), and compares the total historic with the total forecast costs in the BPQ submission for the next review period (NB: 5 years), as a high level indication of the general trends in each cost item. The forecast for 2007/08 is shown for completeness but is not included in the totals.

GDN Reported Net Capex (£m 2005/06 prices)	2002/03	2003/04	2004/05	2005/06	2006/07	Total Historic Period	2007/08	Next Period Total	Change
System Operations	0.8	1.1	1.0	0.0	0.4	3.3	4.6	14.5	11.2
IS Infrastructure	0.0	0.0	0.0	0.9	3.2	4.1	0.0	11.8	7.7
IS Systems	2.1	3.5	3.1	10.5	10.6	29.9	5.3	24.8	-5.1
xoserve Capex	0.0	0.0	0.0	0.0	0.0	0.0	0.6	5.7	5.7
Vehicles	1.9	0.2	0.0	0.3	0.8	3.2	7.2	14.0	10.8
Telecoms, Office	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.0
Security	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.1	2.1
Furniture and fittings	0.3	0.0	0.0	0.2	0.3	0.9	0.0	1.3	0.5
Tools & Equipment	0.6	0.8	0.3	1.0	0.3	2.9	0.7	3.7	0.8
Other	1.6	0.0	0.3	0.0	0.0	1.9	0.0	0.0	-1.9
Total	7.5	5.6	4.7	12.9	15.7	46.4	18.6	78.3	31.9

Table 7-2

7.3.1.1 System Operation

GDN network control is currently carried out by NGG on behalf of the networks, as part of the SOMSA agreements. It is therefore not meaningful to compare historic performance of the GDNs in relation to System Operation costs. This section therefore only briefly presents the historic figures for these cost lines which have been submitted by the GDNs.

7.3.1.2 IS Capex

NGN are forecasting a modest increase in their overall IS Capex (Systems and Infrastructure) expenditure relative to their historical costs.

7.3.1.3 xoserve

xoserve has only existed as a standalone business since 2005. The historical costs above are shown in blue because they reflect a normalisation adjustment. NGN did not submit any Non-Operational Capex for xoserve for any period. However in reviewing the forecast costs (see 7.4.3.3) we have allocated costs to from Opex to Capex in line with their shareholding. Since some of the relevant Capex falls within the historical period (from 2006/07) we have made a corresponding adjustment here to the historical Capex costs. The calculation is explained in 7.4.3.3 and the net historical Capex is shown below.

GDN Reported Net Capex (£m 2005/06 prices)	2002/03	2003/04	2004/05	2005/06	2006/07	Total Historic Period	2007/08	Next Period Total	Change
System Operations	0.8	1.1	1.0	0.0	0.4	3.3	4.6	14.5	11.2
IS Infrastructure	0.0	0.0	0.0	0.9	3.2	4.1	0.0	11.8	7.7
IS Systems	2.1	3.5	3.1	10.5	10.6	29.9	5.3	24.8	-5.1
xoserve Capex	0.0	0.0	0.0	0.0	0.1	0.1	0.6	5.7	5.6
Vehicles	1.9	0.2	0.0	0.3	0.8	3.2	7.2	14.0	10.8
Telecoms, Office	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.0
Security	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.1	2.1
Furniture and fittings	0.3	0.0	0.0	0.2	0.3	0.9	0.0	1.3	0.5
Tools & Equipment	0.6	0.8	0.3	1.0	0.3	2.9	0.7	3.7	0.8
Other	1.6	0.0	0.3	0.0	0.0	1.9	0.0	0.0	-1.9
Total	7.5	5.6	4.7	12.9	15.8	46.5	18.6	78.3	31.7

Table 7-3

7.3.1.4 Vehicles

NGN is planning to replace its entire vehicle fleet through the next formula period, reflected in the forecast £10.8m increase in costs on the historical period.

7.3.1.5 Other

Other costs in the Non-Operational Capex category include Telecoms & Office, Security, Furniture and fittings, Tools & Equipment and Other. PB Power has made inter-GDN comparisons of these costs. NGN is not forecasting any significant changes in these items compared to the historical period, apart from £2m in Security expenditure.

7.4 FORECAST

7.4.1 INTRODUCTION

The table below shows the overall forecast position for NGN as submitted in their BPQ

GDN Capital Expenditure £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	5 Yr Total
System Operations	5.9	2.7	1.9	1.9	2.1	14.5
IS Infrastructure	1.7	0.5	2.5	6.3	0.8	11.8
IS Systems	11.0	11.3	2.5	0.0	0.0	24.8
xoserve Capex	0.0	0.0	0.0	0.0	0.0	0.0
Vehicles	4.4	1.3	0.4	3.2	4.7	14.0
Telecoms, Office	0.1	0.1	0.1	0.1	0.1	0.3
Security	0.4	0.4	0.4	0.4	0.4	2.1
Furniture and fittings	0.3	0.3	0.3	0.3	0.3	1.3
Tools & Equipment	0.7	0.7	0.8	0.8	0.7	3.7
Other	0.0	0.0	0.0	0.0	0.0	0.0
Total	24.5	17.3	8.8	12.9	9.1	72.5

Table 7-4

7.4.2 COMPANY PROPOSALS

7.4.2.1 System Operation

NGN has forecast a reasonable level of System Operation Capex.

NGN are forecasting that from 2009 they will undertake operational gas control duties currently being handled by NGG. This will ensure that NGN will have complete autonomy over its' business boundaries.

7.4.2.2 IS Capex

In their submission, NGN has submitted a line of GTMS Replacement costs totalling £4.5m as a component of their IS Systems costs. We believe these should be considered as System Operation Capex, since we are dealing with the allowed costs of GTMS replacement within System Operation Capex. We have therefore made a normalisation adjustment to move that cost line into System Operation Capex (see Table 7-1).

7.4.2.3 xoserve

The following table shows how NGN has submitted its total xoserve costs, split between Opex and Capex, alongside the equivalent figures which xoserve has submitted for its anticipated turnover from NGN.

Northern	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	Total shown	5year total
Opex	3.10	3.70	3.90	5.10	3.40	5.20	4.80	3.40	3.40	36.00	21.90
Capex	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	3.10	3.70	3.90	5.10	3.40	5.20	4.80	3.40	3.40	36.00	21.90
xoserve turnover	2.95	3.75	3.91	5.13	3.39	5.22	4.76	3.36	4.41	36.87	21.86
Difference	-0.15	0.05	0.01	0.03	-0.01	0.02	-0.04	-0.04	1.01	0.87	-0.04

Table 7-5

For all GDNs, the amount they anticipate being charged is the same (within rounding errors) as the turnover xoserve expects to receive.

However, we believe that NGN should be allocating some of their expenditure to Capex. We explain our proposed adjustment in section 7.3.3.4 below.

7.4.2.4 Vehicles

During the next period, NGN proposes to replace 35 vehicles in 2006/07, and then 635 over the 5 year formula period, at a total cost of £14m and anticipates a 15-20% increase in maintenance costs if vehicles are not replaced through the plan.

7.4.2.5 Other

NGN are forecasting £0.3m for Telecoms & Office costs, £3.6 for Tools & Equipment, £2.1m for Security, and £3.7m for Tools & Equipment but no other 'Other' Non-Operational Capex. These items are reviewed in 7.3.3.5 below.

7.4.3 SPECIFIC COST AREAS

7.4.3.1 System Operation

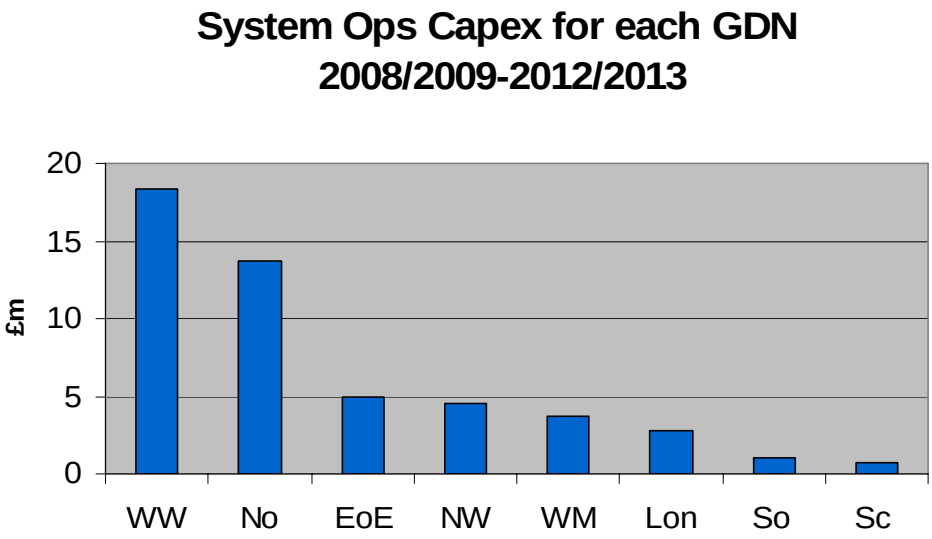

Figure 7-2

NGN's proposed spend on System Operations Capex is higher than all but one of the other GDNs, as illustrated above.

However, it was clear at the point of network sales that costs associated with SOMSA exit would not be allowed, and Ofgem set out the following principles in its consultation document[4] regarding the allowable costs for GTMS replacement:-

- Ofgem must be satisfied that GTMS is obsolete before any replacement costs are allowed.
- Only efficient costs of GTMS replacement would be allowed. Any additional costs intended to facilitate SOMSA exit would not be allowed, nor any costs associated with bringing forward the replacement to facilitate SOMSA exit.

We are satisfied that the GTMS is effectively obsolete, as from 2009 spares will no longer be readily available and the operating system will no longer be supported by the suppliers.

We believe that the collaborative programme of replacement is the most efficient solution, and therefore that the agreed allocation of the costs of Phase 1 (implementation of DNCS into NGG) constitute allowable costs, according to Ofgem's principles above. In addition, we are aware that NGG propose to charge the GDNs an additional amount to cover NGG's costs in managing the replacement programme. We therefore believe the iGDNs should also be allowed an amount to cover this additional cost. On the information we have been given through the BPQ and SQs, we believe that any other System Operation Capex expenditure during the forthcoming period will be associated with SOMSA exit and is therefore not allowable.

The cost allocation agreed through the collaborative project are shown below, along with a 50% uplift for the non-NGG GDNs which we estimate should reflect what they are likely to be charged by NGG for programme management:-

[4] Third Consultation, section 3.28, p23

Phase 1 Costs - Established Position Cost Sharing £m agreed between the Parties	NGG	NGN	WWU	SGN	Total
Without Uplift	9.70	1.17	1.06	2.11	14.04
After Uplift	9.70	1.80	1.59	3.16	16.25
Date of SOMSA exit	-	Apr-09	Sep-09	Sep-08	

Table 7-6

NGN's share of the established costs is £1.17m, and after our 50% uplift, their allowance is calculated at £1.80m.

We have made a further allowance for Non-SCADA systems. NGG has estimated the costs of replacement of SC2004 and other non-SCADA systems as £7.8m in total for all its networks. It has also estimated a cost of £4.6m which it expects to be paid for by the iGDNs for 'Analysis and Delivery' of Non-SCADA systems.

SC2004 is in need of rationalisation and upgrade as it is an assortment of various disparate systems, including forecasting and interruption management systems. Rather than being technically obsolete or unsupported, the functionality is in part made obsolete as a result of SOMSA exit, but the systems would in any case be due for improvements during the next review period.

We believe that in practice the most effective means of development of SC2004 is still under consideration by NGG and the other GDNs and that it is likely to be most efficient if the GDNs collaborated to provide replacements for the Non-SCADA elements of their required System Control functionality. We also believe that NGG is likely to benefit from the 'Analysis and Delivery', the costs of which it has currently allocated exclusively to the other GDNs.

NGG and the other GDNs may yet choose to adopt a collaborative approach to non-SCADA systems provision, or may choose to develop these systems separately.

We believe it is appropriate that some allowance should be made for all the GDNs for these systems, since they are essential operationally and without them (or access to them) the GDN's will not be able to operate independently.

However, following Ofgem's line in relation to SOMSA exit and GTMS costs, we believe that only efficient costs should be allowed and it would therefore be inappropriate to allow the full costs of new Non-SCADA systems provision to each of the GDNs.

Therefore, we have calculated an allowance for each GDN for Non-SCADA systems based on National Grids' estimate of these two elements of cost associated with Non-SCADA systems. We have allocated a total of £12.4m across all the GDNs on a 4:2:1:1 split (following the basic rationale for the split of GTMS costs). For NGN this results in a total allowance of £1.55m.

We have also allowed for the telemetry costs which NGN have submitted for condition-based telemetry replacement.

Table 7-6 below shows the declared System Operation costs from the BPQ submission, followed by our assessment of the allowable costs, our total deduction, and the remaining 'proposed' System Operation Capex costs.

Northern (£m 2005/06 prices)	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	5 Yr Total
System Operation Costs	0.42	4.64	5.93	2.74	1.88	1.92	2.07	14.54
System Operation Costs after normalisation	0.96	7.49	8.32	4.63	2.09	1.92	2.07	19.04
Allowed Phase 1 GTMS share of Costs	0.54	0.90	0.36	0.00	0.00	0.00	0.00	0.36
Allowed SC2004/Bus Apps Costs	0.00	0.00	0.00	0.00	0.78	0.78	0.00	1.55
Telemetry	0.32	0.00	2.81	1.91	1.66	1.92	2.07	10.37
Total 'Allowed' costs	0.86	0.90	3.17	1.91	2.43	2.70	2.07	12.28
Total 'Efficiency Adjustment'	-	-	-5.15	-2.72	0.34	0.78	0.00	-6.76
Proposed System Operation Costs	-	-	3.17	1.91	2.43	2.70	2.07	12.28

Table 7-7

Note that the phasing of the GTMS costs (which corresponds proportionately to the NGG's declared SOMSA exit costs in the BPQ and our understanding of the project duration) illustrates how the costs fall mostly in the previous period. We are making adjustments for the 2008/09 -2012/13 period only in this report.

7.4.3.2 IS Capex

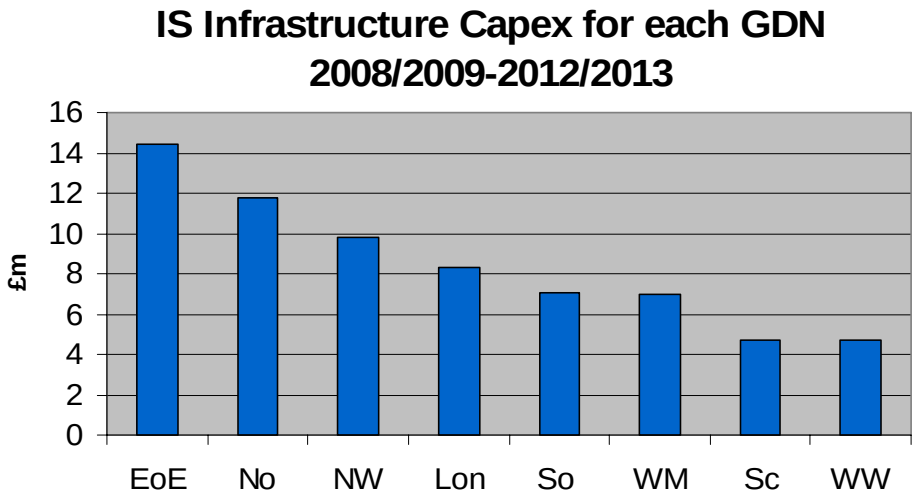

Figure 7-3

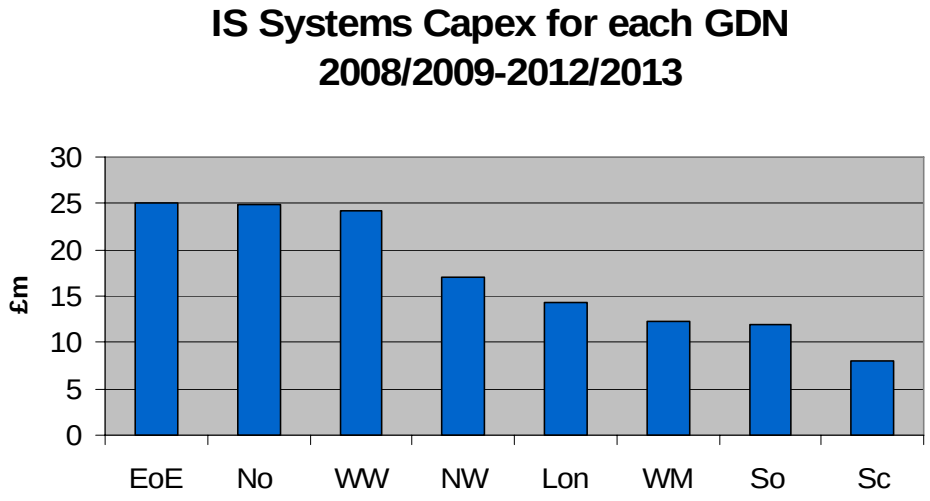

Figure 7-4

NGN's IS Capex appears reasonable relative to the other GDNs as illustrated by the charts above. However, NGN has submitted a line of GTMS costs totalling £4.3m within its IS Systems costs (see Table 7-7 below). We believe that these costs need to be treated as System Operation Capex, since they relate to the replacement for the GTMS, the allowances for which we have discussed and set out in section 7.4.3.1 above. We are therefore proposing a normalisation adjustment to transfer this line of GTMS costs out of IS Systems and into System Operation Capex.

This approach ensures that we are removing the entire line from IS Systems and treating it within System Operation Capex, and avoids the possibility of allowing double counting of the GTMS costs within System Operation Capex.

We have reviewed the submitted IS Costs, and estimate that 20% of the £32.1m expenditure forecast (which does not include the GTMS costs) should yield productivity gains.

Northern (£m 2005/06 prices)	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	5 year total
GTMS Replacement	0.0	0.5	2.8	2.4	1.9	0.2	0.0	0.0	4.5
Strategic Emergency Despatch	0.0	0.0	1.1	4.0	0.0	0.0	0.0	0.0	4.0
Desktop/Mobile Refresh	0.3	2.3	0.0	0.0	0.0	1.9	0.0	0.0	1.9
Enduring Offtake Project	0.0	0.0	0.5	0.7	0.0	0.0	0.0	0.0	0.7
ISystem Operation Accreditation Project	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.8
FOMSA Support Re-Tender	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.9
FOMSA Technical Upgrade/Refresh	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0	5.8
MasterMap Upgrade	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.9
BP Optimisation	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	2.5
GDNS Support	0.0	0.0	0.8	1.7	1.5	0.0	0.0	0.0	3.1
GDN Change Requests	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	1.7
IS Infrastructure < £0.5m	0.5	1.0	0.0	1.7	0.5	0.5	0.5	0.8	4.1
IS Systems < 0.5m	0.4	0.0	0.0	1.5	1.9	1.4	0.0	0.0	4.8
Total IS Capex (excl GTMS)	1.3	3.2	2.4	10.3	9.9	4.8	6.3	0.8	32.1
Assumed Productivity 20% Total	0.3	0.6	0.5	2.1	2.0	1.0	1.3	0.2	6.4
NGN GTMS costs - moved to System Operation Capex				*2.4*	*1.9*	*0.2*	*0.0*	*0.0*	*4.5*

Table 7-8

7.4.3.3 xoserve

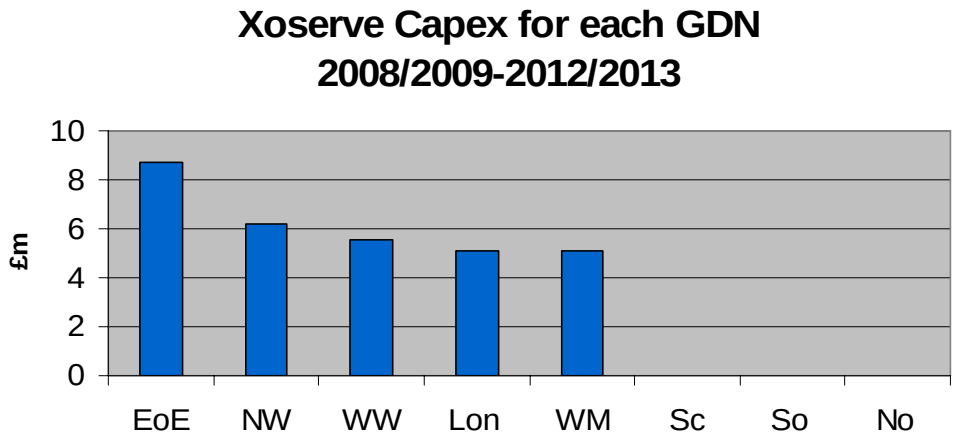

Figure 7-5

Although the total amount of expenditure submitted by all the GDN's equals the turnover that xoserve has set out as expected, three GDNs including NGN have not submitted any of their share as Capex. Since the costs relate to capital projects which xoserve intend to charge in the year in which they are incurred, we believe it is appropriate that an element of each GDN's total xoserve costs should be allocated as Capex. This applies from 2006/07, when the first project Capex is scheduled to be incurred.

In the case of WWU and the NGG's GDNs we have verified that the Opex/Capex split is such that the Capex allocation reflects their proportionate shareholding in xoserve and hence their appropriate share of the costs allocated to them. We have used this approach to estimate appropriate Capex allocations for those GDNs who have not charged some of their xoserve costs to Capex.

This calculation is set out for NGN below:-

Shareholding Allocations		%	%
National Grid		56.57	45.57
South		16.05	16.05
Scotland		6.97	6.97
Northern		10.38	10.38
Wales & West		10.03	10.03
NTS	-		11.00
Total		100	100

Table 7-9

NGN's shareholding in xoserve is 10.38%.

Ratio Calculation	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
NG Capex	0.00	0.60	2.90	8.30	0.60	8.70	6.90	0.60
WW Capex	0.00	0.13	0.61	1.82	0.15	1.93	1.50	0.15
NG Ratio	0.00	0.013	0.064	0.182	0.013	0.191	0.151	0.013
WW Ratio	0.00	0.013	0.061	0.181	0.015	0.192	0.149	0.015
Average	0.00	0.01	0.06	0.18	0.01	0.19	0.15	0.01

Table 7-10

Applying the average ratio for each year (from Table 7-9) to the NGN Shareholding allocation gives the following:

Northern (£m 2005/06 prices)	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	5year total
Submitted Opex	3.10	3.70	3.90	5.10	3.40	5.20	4.80	3.40	21.90
Submitted Capex	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	3.10	3.70	3.90	5.10	3.40	5.20	4.80	3.40	21.90
Calculated Capex	0.00	0.13	0.65	1.89	0.15	1.99	1.56	0.15	5.73
Calculated Opex	3.10	3.57	3.25	3.21	3.25	3.21	3.24	3.25	16.17
Adjustment	0.00	0.13	0.65	1.89	0.15	1.99	1.56	0.15	5.73

Table 7-11

We therefore propose a normalisation adjustment of £5.73m for the period should be added to NGN's Non-Operational Capex, and a corresponding amount to be taken from their xoserve Opex (ref Opex report section 9). Please note that this table also shows the calculation of the same adjustment for the years 2006/07 and 2007/08, totalling £0.78m to be transferred to Capex from Opex. This is shown in Table 7-2b in the historical performance section.

7.4.3.4 Vehicles

Comparing vehicles to numbers of employees, we have performed a regression of this data and it is clear that there is a broadly consistent approach, demonstrating the dependency of vehicles on the number of employees.

7.4.3.5 Other

Other Costs in the Non-Operational Capex category comprise Telecoms & Office, Security, Furniture and fittings, Tools & Equipment and 'Other'. NGN has not submitted

any 'Other' Capex, and the remaining items of Non-operational Capex are compared below with the other GDNs.

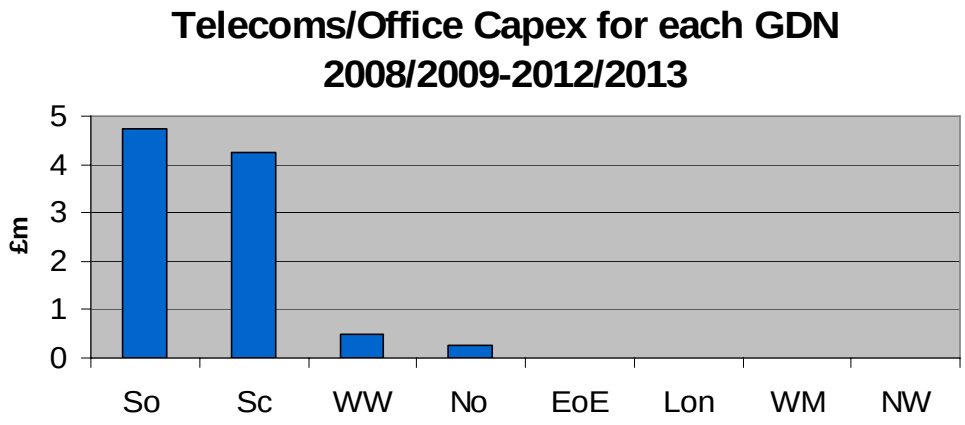

Figure 7-6

NGN's proposed Capex for Tools/Equipment, and for Telecoms/Office are the lowest of all the GDNs.

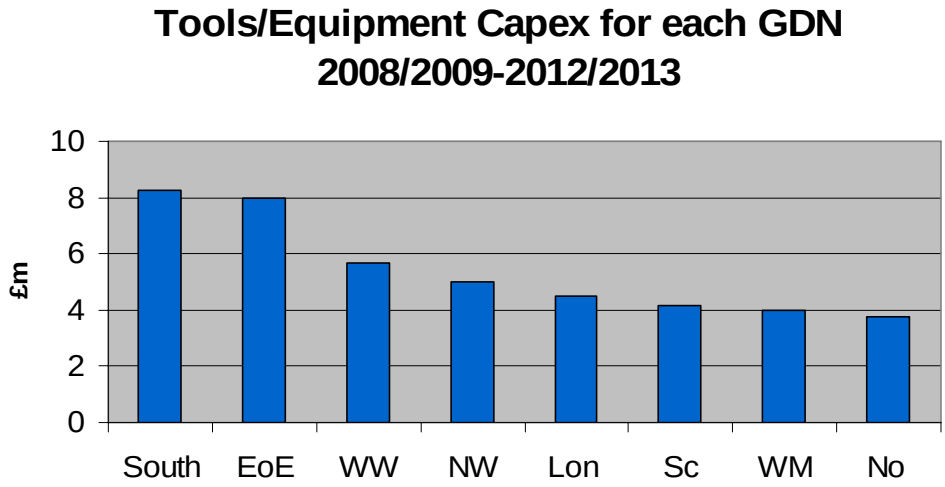

Figure 7-7

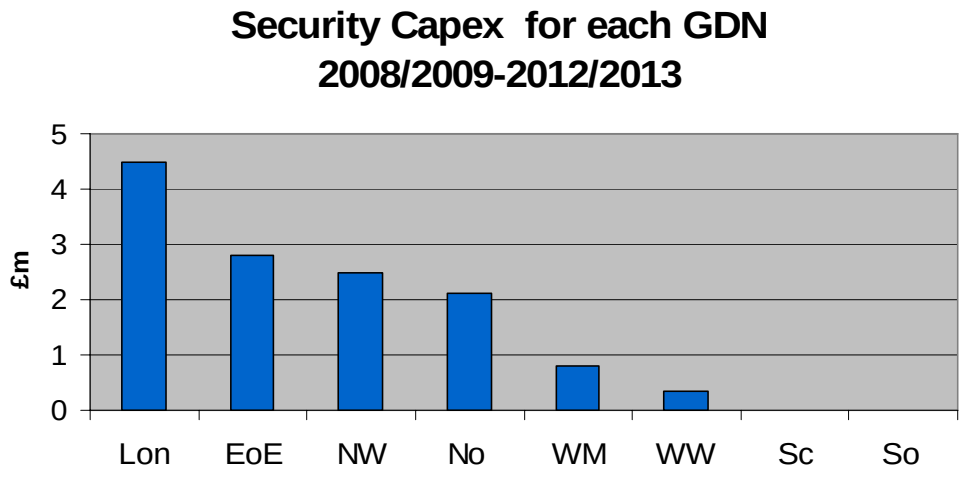

Figure 7-8

NGN have also submitted a comparatively low figure for Security Capex, and although they are one of only two GDNs to submit costs for Furniture and Fittings, the level of expenditure over a 5 year period does not seem unreasonable.

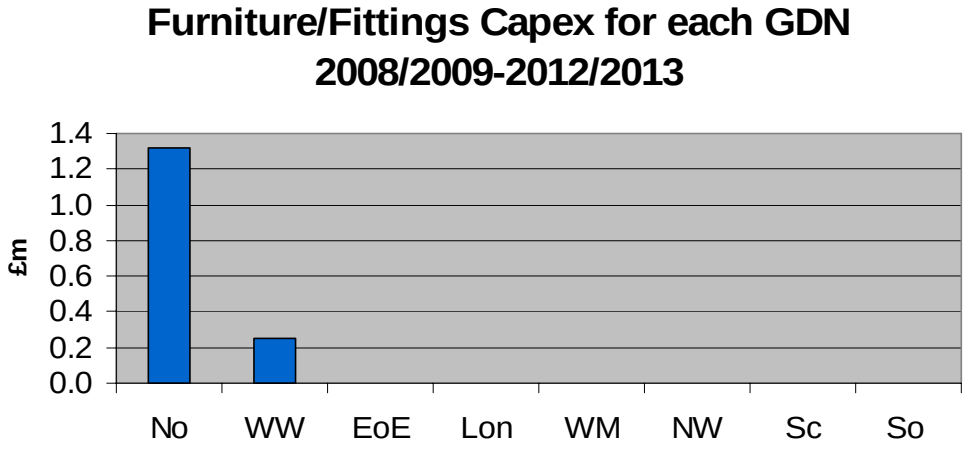

Figure 7-9

7.4.4 RECOMMENDATIONS

7.4.4.1 System Operation

PB Power believes that the allowable costs of GTMS replacement, according to Ofgem's principles set out in the Consultation document, are the costs associated with the delivery of Phase 1 of the collaborative project to replace the existing system. We believe the collaborative project is the most efficient means of delivering GTMS replacement. The costs of Phase 1 have been allocated between the parties to the collaboration agreement and NGN's agreed share overall is £1.17m. We calculate this gives NGN an expenditure of £1.80m for the project, which is due to be spent mostly during 2006/07 and 2007/08. We have phased this allowable cost in line with the declared spend on GTMS, resulting in an allowable cost for 2008/09 of £0.36m.

We have calculated a further allowance for Non-SCADA systems upgrades based on an overall view of efficient costs of replacement for all the GDNs combined. We have split

this allowance between the GDN's on a 4:2:1:1 basis (giving a total of £1.55m for Northern)

We have also allowed for condition-based telemetry replacement costs.

7.4.4.2 IS Capex

We propose a normalisation of £4.5m GTMS costs which were submitted as part of IS Systems Costs into System Operation Capex. The net effect of this is to disallow £2.7m (=£4.5m-£0.36m) of the GTMS costs which is the extent to which they exceed the agreed costs of the programme. PB Power is not proposing any efficiency adjustments to IS Capex Spend at this time. Further work is ongoing to determine whether levels of expenditure are appropriate for IS projects.

7.4.4.3 xoserve

We have validated that the costs submitted by NGN in relation to xoserve accurately reflects what they will be charged by xoserve, and we have estimated how this should be split between Opex and Capex to reflect NGN's share of the Capex project costs. These adjustments are shown in Table 7-11.

7.4.4.4 Vehicles

Since there is consistency in the ratio of numbers of vehicles to number of employees, and NGN's approach to purchase and replacement seems appropriate, no adjustment to the company's proposed costs is necessary.

7.4.4.5 Other

NGN's remaining Non-Operational Capex costs all appear reasonable relative to the other GDNs and therefore no adjustments are necessary.

7.4.4.6 Recommendations Summary

The following summarises our recommendations in respect of Non-Operational Capex:-

The summary table at the start of this chapter shows a total deduction of £6.8m for non-allowed System Operation Capex costs (after including GTMS costs reallocated from IS Capex, and allowances for telemetry and non-SCADA systems) and a reallocation of £5.7m from Opex into Capex in relation to xoserve project costs.

8 MAINS AND SERVICES REPEX

8.1 SUMMARY

Tables for Forecast section for each area of spend £m (05/06)		2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission							
	HSE Enforcement Policy	43.8	46.2	48.3	49.8	51.5	**239.5**
	MP Ductile iron	0.0	0.0	0.0	0.0	0.0	**0.0**
Mains	Non-Rechargeable Diversions	0.2	0.2	0.3	0.3	0.3	**1.5**
	Other Policy & Condition	2.5	2.5	2.5	2.5	2.5	**12.4**
	Rechargeable Diversions (Net)	-0.2	0.1	0.2	0.1	0.1	**0.1**
	Non-Domestic Services	0.6	0.6	0.6	0.6	0.6	**2.8**
Services	Domestic Services	23.0	23.5	23.7	24.1	24.5	**118.8**
	Multi-occupancy Buildings	1.4	1.4	1.3	1.3	1.3	**6.7**
Total		**71.2**	**74.3**	**76.8**	**78.7**	**80.8**	**381.8**
Normalisation Adjustments							
Total		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Normalised							
	HSE Enforcement Policy	43.8	46.2	48.3	49.8	51.5	**239.5**
	MP Ductile iron	0.0	0.0	0.0	0.0	0.0	**0.0**
Mains	Non-Rechargeable Diversions	0.2	0.2	0.3	0.3	0.3	**1.5**
	Other Policy & Condition	2.5	2.5	2.5	2.5	2.5	**12.4**
	Rechargeable Diversions (Net)	-0.2	0.1	0.2	0.1	0.1	**0.1**
	Non-Domestic Services	0.6	0.6	0.6	0.6	0.6	**2.8**
Services	Domestic Services	23.0	23.5	23.7	24.1	24.5	**118.8**
	Multi-occupancy Buildings	1.4	1.4	1.3	1.3	1.3	**6.7**
Total		**71.2**	**74.3**	**76.8**	**78.7**	**80.8**	**381.8**
Adjustments							
	HSE Enforcement Policy	-1.7	-3.0	-4.6	-6.2	-7.6	**-23.0**
	MP Ductile iron	0.1	0.1	0.1	0.1	0.1	**0.3**
Mains	Non-Rechargeable Diversions	0.0	0.0	0.0	0.0	0.0	**-0.1**
	Other Policy & Condition	0.0	-0.1	-0.2	-0.2	-0.3	**-0.8**
	Rechargeable Diversions (Net)	0.0	0.0	0.0	0.0	0.0	**0.0**
	Non-Domestic Services	0.0	0.0	0.0	0.0	0.0	**-0.1**
Services	Domestic Services	0.6	-0.1	-0.5	-1.1	-1.7	**-2.7**
	Multi-occupancy Buildings	-0.7	-0.7	-0.7	-0.7	-0.7	**-3.4**
Total		**-1.7**	**-3.8**	**-5.9**	**-8.1**	**-10.2**	**-29.8**
Proposed							
	HSE Enforcement Policy	42.1	43.2	43.7	43.6	43.9	**216.5**
	MP Ductile iron	0.1	0.1	0.1	0.1	0.1	**0.3**
Mains	Non-Rechargeable Diversions	0.2	0.2	0.3	0.3	0.3	**1.4**
	Other Policy & Condition	2.4	2.3	2.3	2.2	2.2	**11.5**
	Rechargeable Diversions (Net)	-0.2	0.1	0.2	0.1	0.1	**0.1**
	Non-Domestic Services	0.5	0.5	0.5	0.5	0.5	**2.7**
Services	Domestic Services	23.6	23.4	23.2	23.0	22.8	**116.1**
	Multi-occupancy Buildings	0.7	0.7	0.7	0.7	0.7	**3.4**
Total		**69.5**	**70.5**	**70.9**	**70.5**	**70.6**	**351.9**

Table 8-1

8.2 POLICIES & PROCEDURES

T/PL/REP1 and T/PL/REP2 are the key documents requiring the monitoring and removal of risk arising from the distribution system. The mains and services replacement requirements are defined in a policy document (T/PL/REP1) and the procedure in T/PL/REP2. These documents form part of a suite of policies and procedures with comprehensive coverage of the Network's operations. Appendix 1 describes the framework in which the policies and procedures sit and the arrangements for governance, monitoring and review.

The current documents describe the requirements and processes for the replacement of all distribution pipes from identifying those pipes to be replaced, prioritising for replacement and developing projects. The design and optimisation of the replacement system relies on other policies and procedures. The documents have been reviewed and updated on a number of occasions in recent years and a further change has recently been considered.

We found no evidence that the policy and procedure were not properly implemented.

8.3 HISTORICAL PERFORMANCE

8.3.1 INTRODUCTION

Replacement mains

The replacement of iron mains and associated services is an essential part of the Network's strategy for controlling the risk arising from the network. The rate of replacement and the procedures associated with the selection of pipes and development of projects are regulated by the HSE using the Gas Safety (Management) Regulations and the Pipelines Safety Regulations to enforce its policy. Ofgem's role is to ensure that the Network can fund the programme on an efficient basis.

It is appropriate to re-state here the recent history of the replacement programme that has been running in various forms since the 1970s. HSE requirements and policies and procedures have changed, and the key events are listed below.

Time Line	
2000	HSE issues an Improvement Notice in September 2000 requiring 2360 km of MP DI main within 30m of premises to be de-commissioned by 31.12.2002.
2001	HSE publishes its Enforcement Policy for the replacement of iron gas mains. 91,000km of cast and ductile mains believed to be within 30m of premises. Note that the policy does not include steel mains or service pipes. Ofgem increases mains and services Repex allowances to accommodate the HSE requirement.
2002	Transco introduces T/PR/REP1 & 2 policy and procedure for replacement. REP2 requires steel services to be replaced irrespective of condition (previously PE clad steel services could be transferred if in satisfactory condition) and unprotected steel <=2" to be replaced in the course of routine replacement work. >2" steel subject to risk assessment. Previously these pipes replaced on a condition basis. Initial (20/70/10) policy introduced (supported by "Smallworld")
2003	Pipeline Safety Regulations amended to require Networks to submit a replacement programme for approval. Transco submit an amended 20/70/10 policy (supported by MRDST) to HSE for approval. Agreed providing an equivalent amount of risk is removed from the system each year, and requiring an additional 10% of mains to be de-commissioned. Physical survey reveals that actual population of iron mains was 101,000km at 01.04.02 requiring a 10% increase in production to complete the programme within 30 years. HSE requires a minimum national rate of 3,500km/yr de-commissioned mains (an increase from 3,240km) from 06/07 to meet the 30 yr programme.
2004	Steel pipe included in the risk model.

Table 8-2

The HSE Enforcement policy has been successful in reducing the risk arising from the iron portion of the distribution system. The chart below shows how risk (as predicted from a mathematical model) has fallen steeply in each Network in response to targeted replacement over the last five years.

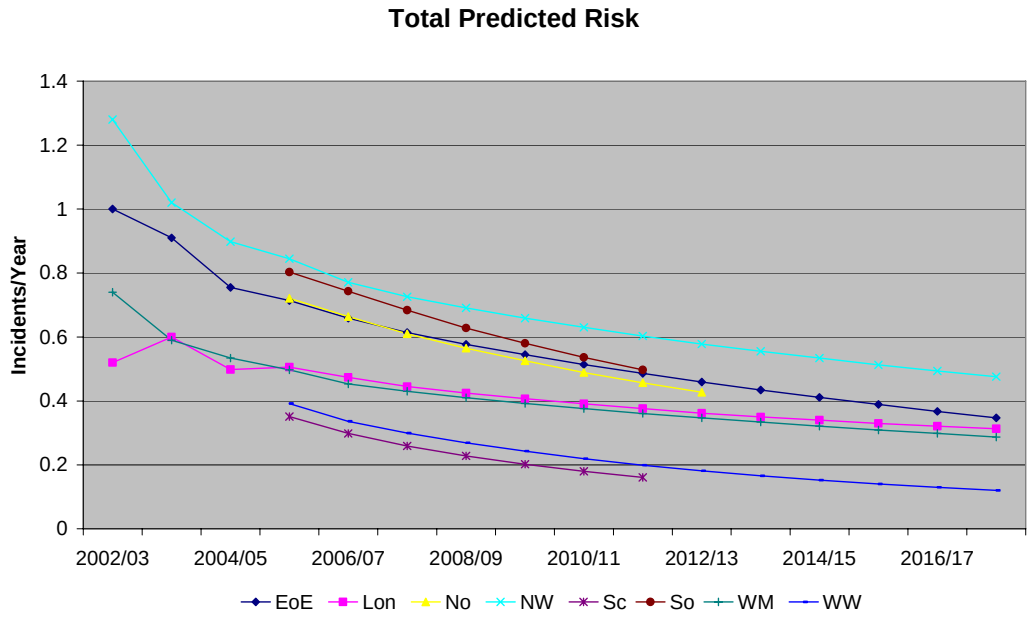

Figure 8-1

However, this has been achieved at increasing expense as Networks have been "ramping-up" their replacement activity to meet the HSE's required national replacement rate of 3,500km/yr by 2007/08.

The replacement of mains also generates a services workload as service pipes must be replaced or re-connected to the replacement main.

8.3.2 DEFINITION OF ACTIVITY

This section of the report deals with:

Replacement mains – costs and volumes reported in section C8 of the Network BPQ workbook (but excluding LTS Repex, see section 9 below)

Replacement services - costs and volumes reported in section C9 of the Network BPQ workbook and including non–domestic services and risers & lateral connections to multiple occupancy buildings.

8.3.3 UNDERLYING COSTS

The table below shows Network reported workload and costs over the first five years of the programme (2006/07 is a forecast)

Distribution Repex Total Cost Trends 2002/03 - 2006/07 £m All Prices 2005/06	2002/03	2003/04	2004/05	2005/06	2006/07
Replacement mains (excluding re-chargeable Diversions	51.9	39.9	37.3	43.7	45.0
Replacement Services (Domestic)	9.9	11.1	17.4	20.4	21.9
Replacement Services (Non-domestic)	0.2	0.2	0.3	0.2	0.6
Multiple Occupancy Buildings	0.0	0.0	0.0	0.0	0.0
Total Distribution Repex	**62.0**	**51.3**	**55.1**	**64.4**	**67.5**
Mains De-commissioned (km)	**412.5**	**419.0**	**478.6**	**523.5**	**565.5**

Table 8-3

2002/03 costs include the final year of the medium pressure ductile iron programme and are thus not representative of the current 30 year programme.

For the period up to 2005/06, costs associated with multiple occupancy buildings have not been separately identified but are included (where they are incurred) within the total. Re-chargeable mains diversions (normally a small negative cost after contributions) are excluded from the table for clarity.

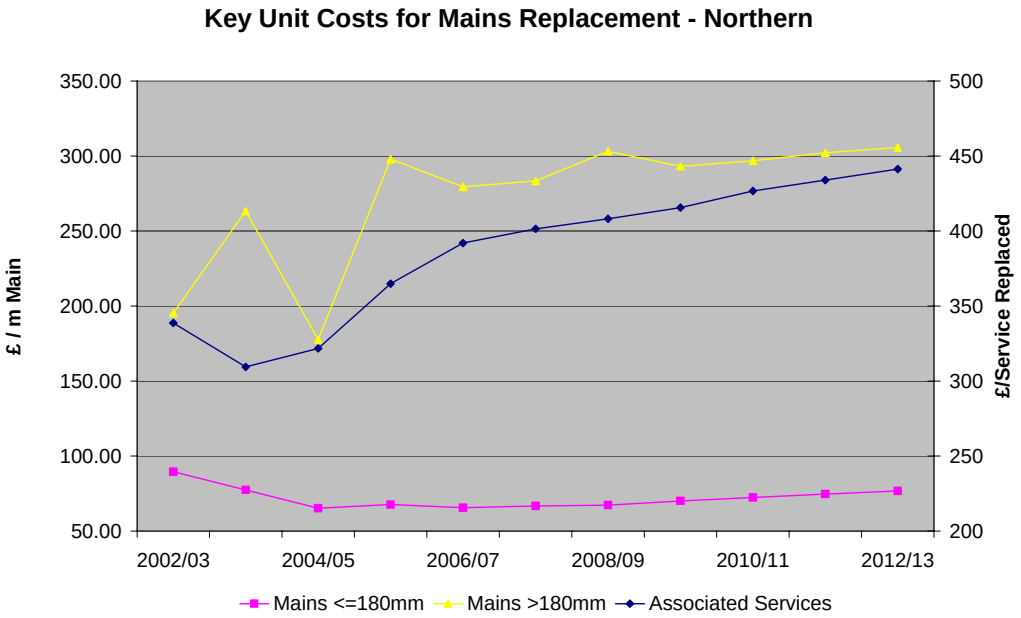

Figure 8-2

Following the completion of the medium pressure ductile iron programme in 2003 mains unit costs (<=180mm diameter) have been successfully contained.

Unit costs for mains >180mm are sensitive to diameter and thus variable in historical years. Unit costs are forecast to rise in line with the Network's assumptions of real price effects. (See 8.4.2 below)

Services unit costs (right hand scale) have risen in contrast to <=180mm mains where the Network has been more successful in controlling its costs.

Total Distribution Repex (Excluding Rechargeable Diversions)

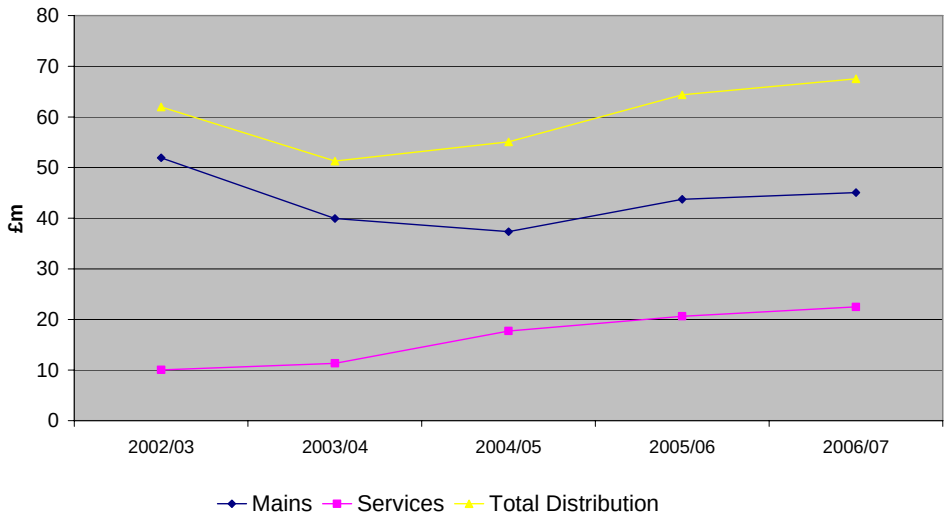

Figure 8-3

After completion of the medium pressure ductile iron programme in 2003, costs have risen as the Network "ramps-up" de-commissioning of iron and other mains to a forecast total of 573km/yr (2007/08).

8.3.4 APPROACH TO THE ASSESSMENT OF EFFICIENCY

Inter-Network Comparison

In assessing the efficiency of investment (2005/06 onwards) we have examined the Network's 2005/06 costs and compared these with the seven other Networks taking into account, as far as is possible, differences such as mains and services workload, the proportions of direct and contract labour, and regional cost differences as derived from indices published by BCIS (The Building Cost Information Service a subsidiary of the Royal Institution of Chartered Surveyors) and DTI – Annual Survey of Hours and Earnings (ASHE).

We have chosen a regression approach as it avoids the direct comparison of unit costs for different disaggregated cost categories, which we regard as unreliable given differences in cost allocation at a disaggregated level, and enables us to compare the Networks' costs and efficiency on a consistent basis

A number of regression options have been explored, and we have concluded that the most suitable regression is achieved by analysis of the logarithmic values of normalised costs and the chosen driver. A "basket of work" approach has been used to produce a weighted average of a number of different work elements (installed mains pipe sizes and services by job type). The driver is calculated by multiplying the work volume by a nominal unit cost for the activity. The approach is not sensitive to the actual level of these nominal unit costs, but works on the relative costs between work types.

This approach allows the analysis to fully reflect the workload forecast by the Networks, adjusted as deemed appropriate by our consultants.

The starting point for setting the target benchmark is an Ordinary Least Squares (OLS) regression on the eight data points, one for each GDN, applicable in the base year (2006/07). The R^2 value indicates how well the variation in costs is explained by the variation in the workload driver.

The OLS regression calculation takes into account all the data points in determining the relationship between the costs and the workload driver. This relationship could be used to determine the frontier costs for each network, but these costs are unlikely to be efficient since generally only some networks will be operating at the efficiency frontier.

We therefore propose to obtain the frontier cost relationship by adjusting the OLS regression line so that it reflects efficient network performance rather than average performance.

This relationship could be constructed by shifting down the regression line until all the data points are above the line except for one data point which is on the line. This is the Corrected Ordinary Least Squares (COLS) regression line.

However, we consider that there are differences between GDNs which may not be fully explained by the regression analysis and that it is reasonable to set the frontier relationship by shifting the regression line down to the upper quartile. This is the upper quartile COLS regression line and is shown in pink on the charts. This is the target which all under performing GDNs should move towards.

Where the regression uses log-linear analysis, the effect of rejecting the OLS regression line as the frontier relationship in favour of the upper quartile COLS regression line is to reduce the target costs of each network by the same percentage.

With this approach, 75% of networks will be performing at or below the frontier in the base year and these networks will be expected to continue to improve their performance over the period to 2012/13. The resulting target costs for 2012/13 are shown in yellow on the charts.

There is a further description of the analysis techniques employed in section 2 of this report.

Figure 8-4 shows the output from benchmarking analysis of 2005/06 cost performance for replacement mains and services.

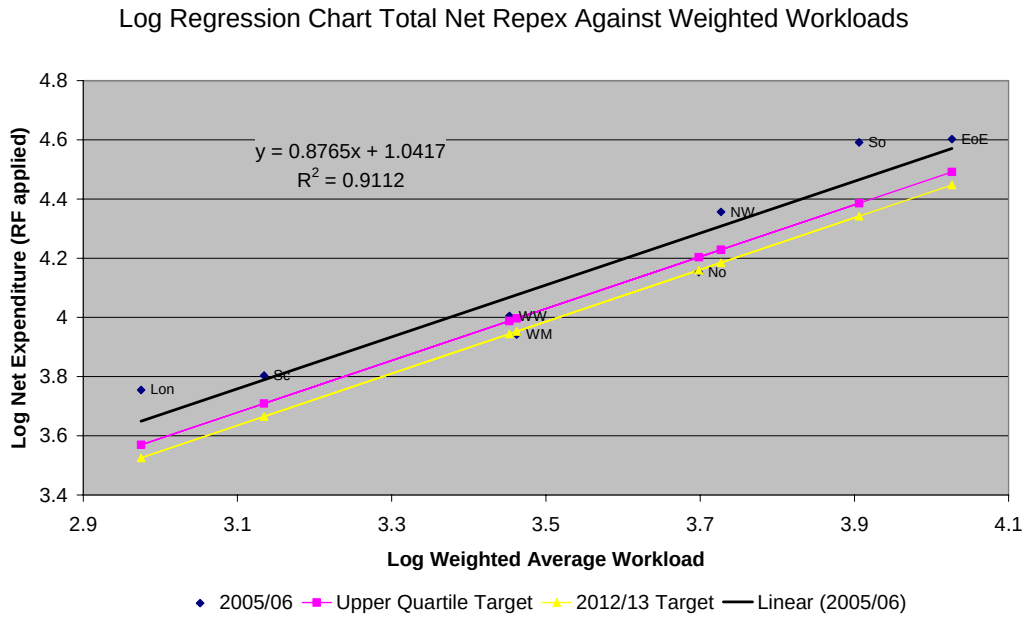

Figure 8-4

In the chart above (2005/06) Northern is ahead of the upper quartile and is the second most efficient Network

Comparison with Other Utilities' Costs

Ofwat Comparison

We have compared the cost of the Network's activities with data for water supply companies published by Ofwat.[5]

Gas and water mains installation activities are similar to the extent that the companies work in comparable conditions using similar technologies based around PE pipe systems. There are many minor differences which we have not evaluated and one major difference: the gas supply network has few valves, and flow-stopping equipment is needed for every dis-connection and re-connection required by the replacement process, whereas in water supply flow-stopping is achieved by operating existing valves. These "live gas" connections account for a significant element of mains replacement costs.

The replacement of gas and water services differs in that a water company's ownership ends at the footpath stop valve whereas the gas network extends to the meter control valve. In addition GDNs are required to undertake soundness and appliance safety checks prior to restoring the supply.

As part of its review process Ofwat compiles a series of "standard cost estimates" provided by the water companies. These cost estimates are prepared in accordance with assumptions provided by Ofwat to exclude atypical costs and normalise certain other costs. Because of this the Ofwat costs are lower than those that would normally be achieved within the business.

We have compared the standard costs estimates with the unit costs within the companies' BPQ submissions. These unit costs include all costs for the activity and therefore allowance must be made for the difference between the Network unit costs and standard cost estimates. The principal differences are:

- The additional cost of gas connections.
- Disposal of excavated material beyond the assumed 1km.
- Replacement of the entire gas service and gas safety obligations

For comparison purposes an adjustment has been made to reported costs to allow for the above and this shows that gas and water costs are generally of the same order.

[5] Water and sewerage service unit costs and relative efficiency 2003-04 report - Ofwat

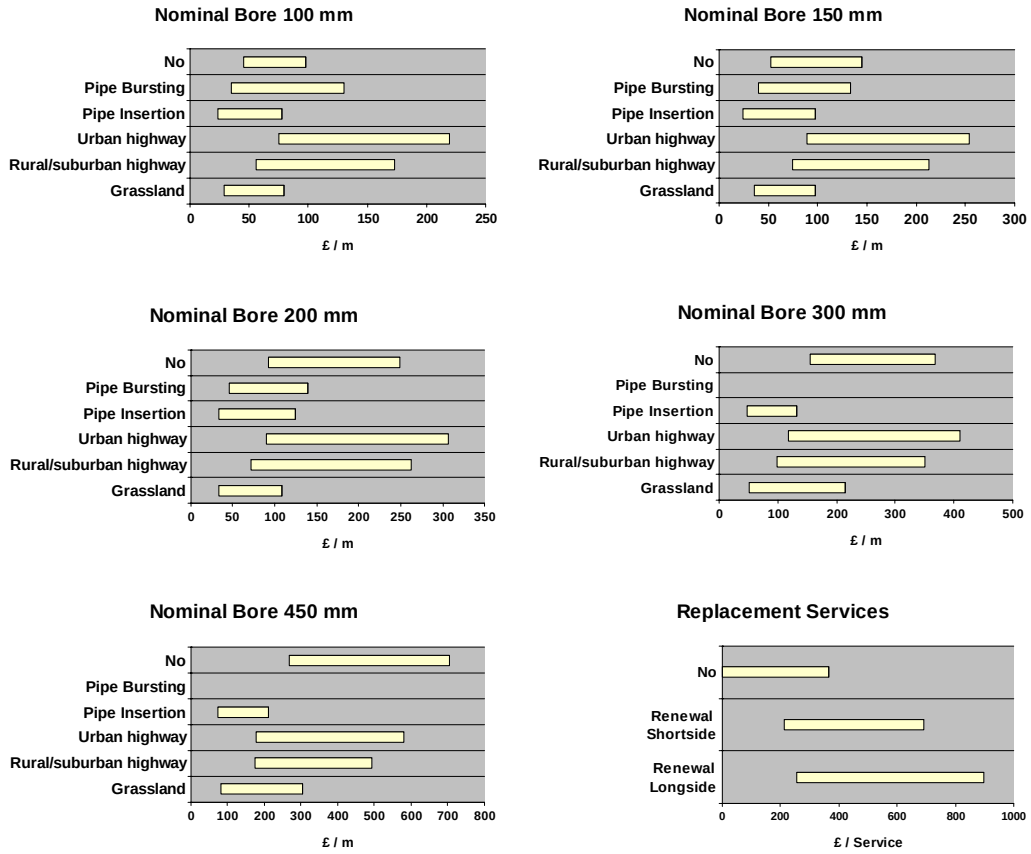

Figure 8-5

Base Year (2005/06) Assumptions and Adjustments

We have carefully examined the base year volumes and costs since it is this year that establishes the relative position of the Network and the potential efficiency savings available.

Installed Mains Base Year (2005/06) Assumptions and Adjustments (Excluding Re-Chargeable Diversions)	Volume (km)	Gross (Including Overheads) £m
BPQ Submission		
HSE Enforcement Policy	442.6	40.6
MPDI Programme	1.1	0.0
Other Policy & Condition Mains	30.2	2.6
Non-rechargeable Diversions	2.5	0.6
Total Repex Mains	**476.4**	**43.7**
Normalised BPQ		
HSE Enforcement Policy	442.6	40.6
MPDI Programme	1.1	0.0
Other Policy & Condition Mains	30.2	2.6
Non-rechargeable Diversions	2.5	0.6
Total Repex Mains	**476.4**	**43.7**

Table 8-4

We have made no adjustment to 2005/06 mains costs and volumes.

Replacement Services-domestic Base Year (2005/06) Assumptions and Adjustments	Volume	Gross (Including Overheads) £m
BPQ Submission		
Domestic Services		
Relaid services associated with mains replacement	25218	10.4
Relaid services not associated with mains replacement (bulk relays)	0	0.0
Services relaid after escape	6656	2.7
Service test & transfer to new or other main	25321	3.6
Reposition domestic meter - service relays	532	0.1
Purge & relight after domestic service work	30407	0.0
Service relay domestic meterwork	0	1.2
Other domestic services	1487	2.4
Total domestic services		**20.4**
Non-domestic Services	**50**	**0.2**
Multiple Occupancy Buildings		
Renew risers	0	0.0
Renew service connections	0	0.0
Total - Multiple Occupancy Buildings		**0.0**
Total Services		**20.6**
Normalised BPQ		
Domestic Services		
Relaid services associated with mains replacement	25218	10.4
Relaid services not associated with mains replacement (bulk relays)	0	0.0
Services relaid after escape	6656	2.7
Service test & transfer to new or other main	25321	3.6
Reposition domestic meter - service relays	532	0.1
Purge & relight after domestic service work	30407	0.0
Service relay domestic meterwork	0	1.2
Other domestic services	1487	2.4
Total domestic services		**20.4**
Non-domestic Services	**50**	**0.2**
Multiple Occupancy Buildings		
Renew risers	0	0.0
Renew service connections	0	0.0
Total - Multiple Occupancy Buildings	**0**	**0.0**
Total Services		**20.6**

Table 8-5

We have made no adjustment to 2005/06 services costs and volumes.

Multiple Occupancy Buildings

Historically, the cost of the replacement of that part of the distribution system within apartment blocks has been allocated to mains and services. Typically the cost of replacement risers (the vertical pipes within the block) was allocated to mains and the cost of the lateral connections to services. Work of this type was relatively unusual, and the allocation of costs and volumes was absorbed without overly distorting unit costs.

More recently, Networks have needed to replace these systems more frequently, often by constructing a new system on the face of the building which requires temporary access

by scaffolding. The cost of these replacements is high and Networks requested that these costs were separately identified within the BPQ.

We believe that within the current period the cost of replacement risers, as well as laterals, may have been allocated to services and that, if this is so, services costs may be inflated. This would ultimately be to the advantage of the Networks should a separate allowance for multiple occupancy buildings be made within the next control.

From information provided by the Network, verified by the comparison of unit costs and contract rates, we are confident that these additional costs are not likely to be significant in Northern Network.

8.4 FORECAST

8.4.1 INTRODUCTION

The Network forecast is generated in seven work categories:

HSE's Enforcement Policy for the Replacement of Iron Gas Mains.

The Repex forecast is aimed principally at delivering the requirements of the HSE as defined in its 2001 Enforcement Policy[6]. This requires iron mains within 30m of premises to be de-commissioned over the period to March 2031. The Network follows a programme, accepted annually by HSE, to achieve this.

Medium Pressure Ductile Iron Programme

This deals with any instances of medium pressure ductile iron mains within 30m of premises. These mains were de-commissioned in a major programme ending in 2003 but any encroachment, e.g. through new development, will trigger a replacement project.

The Network has forecast a small workload of 0.9km/yr

Other Policy and Condition Mains

Small diameter steel mains are replaced if they are associated with Enforcement Policy work; other mains of any material may be replaced on the basis of condition.

The Network forecasts a workload in this sector of approximately 30km/yr

Non-rechargeable diversions

The Network will occasionally be required to divert mains at its own expense and forecasts a small workload of 4.5km/year

Re-chargeable diversions

The Network is required to divert mains on a rechargeable basis, usually in conjunction with highway alterations. The Network is forecasting a workload of approx. 20km/year and minor expenditure caused by a national agreement (in respect of work promoted by Highway Authorities) to fund 18% of the cost in exchange for payment in advance.

Replacement Services

Services replaced or transferred in association with mains replacement or relaid after escape, plus a range of other minor services activities.

Multiple Occupancy Buildings

Replacement of risers (> 20m) and laterals supplying multiple occupancy buildings.

The Network has forecast a workload of 1237 connections per year.

Forecasting Process

[6] THE HEALTH AND SAFETY EXECUTIVE'S ENFORCEMENT POLICY FOR THE REPLACEMENT OF IRON GAS MAINS – September 2001

Our review of the forecast has focussed on the major cost areas; the HSE's Enforcement Policy programme, Other Policy and Condition mains, Replacement Services and Multiple Occupancy Buildings.

Mains

We have reviewed the process used by the Network to generate its forecast. We found that the Network reasonably takes into consideration relevant factors that influence the forecast; the length and diameter mix of mains to be de-commissioned and installed, the likely ratio of installed to de-commissioned mains, the likely method of construction, the combined impact of upsizing and downsizing and the requirement for associated reinforcement of the system. Historical data is used to inform the forecast and this is modified where appropriate. The Network considers the impact of average system pressure increases, in compensation for downsizing, and the associated incremental change in the (Opex) cost of emissions, shrinkage and escapes.

Services

Services workload forecasts are similarly generated using historical ratios modified in the light of expected changes to the make-up of the mains workload.

Outputs

Within the forecasting process outputs are also considered. The Network forecasts annually the reduction in risk arising from the distribution system that can be attributed to its replacement programme and the impact of the programme on network capacity is considered on a project by project basis.

Overall we found the Network's forecasts to be reasonably accurate although we have made some minor adjustments which are detailed in section 8.4.2 below.

GDN Volumes (as presented) (Excluding Re-Chargeable Diversions)	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Installed Mains (km)							
HSE Programme	467.2	473.7	474.7	475.9	476.8	477.4	477.9
MPDI Programme	0.9	0.9	0.9	0.8	0.8	0.8	0.8
Non-rechargeable Diversions	4.1	4.1	4.2	4.0	4.1	4.0	4.1
Other Policy & Condition Mains	31.8	32.1	32.2	30.7	29.9	29.3	28.5
Total Installed Mains (km)	**504.0**	**510.8**	**512.0**	**511.4**	**511.6**	**511.5**	**511.3**
Replacement Services - domestic							
Relaid services associated with mains replacement	26784	27156	27198	27187	27188	27193	27190
Relaid services not associated with mains replacement (bulk relays)	100	100	100	100	100	100	100
Services relaid after escape	5883	5883	5883	5883	5883	5883	5883
Service test & transfer to new or other main	16313	16540	16565	16558	16559	16562	16561
Reposition domestic meter - service relays	1524	1524	1524	1524	1524	1524	1524
Purge & relight after domestic service work	48750	49427	49503	49483	49486	49494	49490
Service relay domestic meterwork	0	0	0	0	0	0	0
Other domestic services	416	416	416	416	416	416	416
Total Domestic Services	**99770**	**101046**	**101189**	**101151**	**101156**	**101172**	**101164**
Replacement Services - Non-domestic	**374**	**379**	**379**	**379**	**379**	**379**	**379**
Multiple Occupancy Buildings							
Renew service connections	0	0	684	684	684	684	684
Total riser renewals (m)	0	0	1237	1237	1237	1237	1237

Table 8-6

GDN Costs as presented (Normalised) £m 2005/06 Prices (Excluding Re-Chargeable Diversions)	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Installed Mains							
HSE Programme	42.4	43.6	43.8	46.2	48.3	49.8	51.5
MPDI Programme	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-rechargeable Diversions	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Other Policy & Condition Mains	2.4	2.5	2.5	2.5	2.5	2.5	2.5
Total Installed Mains	**45.0**	**46.3**	**46.5**	**48.9**	**51.1**	**52.6**	**54.3**
Replacement Services - Domestic							
Relaid services associated with mains replacement	11.9	12.3	12.5	12.8	13.0	13.2	13.4
Relaid services not associated with mains replacement (bulk relays)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Services relaid after escape	2.5	2.5	2.6	2.6	2.7	2.7	2.7
Service test & transfer to new or other main	3.6	3.7	3.8	4.0	3.9	4.0	4.1
Reposition domestic meter - service relays	2.8	2.8	2.9	2.9	3.0	3.0	3.1
Purge & relight after domestic service work	0.9	0.9	0.9	0.9	0.9	1.0	1.0
Service relay domestic meterwork	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other domestic services	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Domestic Services	**21.9**	**22.4**	**23.0**	**23.5**	**23.7**	**24.1**	**24.5**
Replacement Services - Non-domestic	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
Multiple Occupancy Buildings							
Renew service connections	0.0	0.0	0.2	0.2	0.2	0.2	0.2
Total riser renewals (m)	0.0	0.0	1.1	1.1	1.1	1.1	1.1
Total	**0.0**	**0.0**	**1.4**	**1.4**	**1.3**	**1.3**	**1.3**
Total Repex	**67.5**	**69.2**	**71.4**	**74.3**	**76.6**	**78.6**	**80.7**

Table 8-7

8.4.2 PB POWER PROJECTIONS

Proposed Workloads

Replacement Mains

In assessing the Network's forecast for mains replacement we have reviewed the annual volume and diameter mix of the proposed workload.

HSE Enforcement Policy

Our starting point was the principal requirement of the HSE's Enforcement Policy – that iron mains within 30m of premises be de-commissioned by March 2031. We have assessed the workload on that basis, taking the remaining population of iron pipes to be de-commissioned (2006) and dividing by 26, the number of remaining years in the programme. The Network has opted to include a two year "ramp-down" period at the end of the programme and we calculated the appropriate rate of abandonment at 552 km/yr, some 24km/yr more than proposed. However, we understand that the network has taken into account the contribution to de-commissioned mains (within the target population) from other replacement activities such as condition replacement and mains diversions and therefore we have not made an adjustment.

Diameter Mix of Installed Mains

In addition to the overall length of installed mains the diameter mix is a significant cost factor. We compared the diameter mix with that of the target population to ensure a reasonable match taking into account that mains insertion (the most economic method of replacement) would create a bias towards the smaller diameters of installed mains.

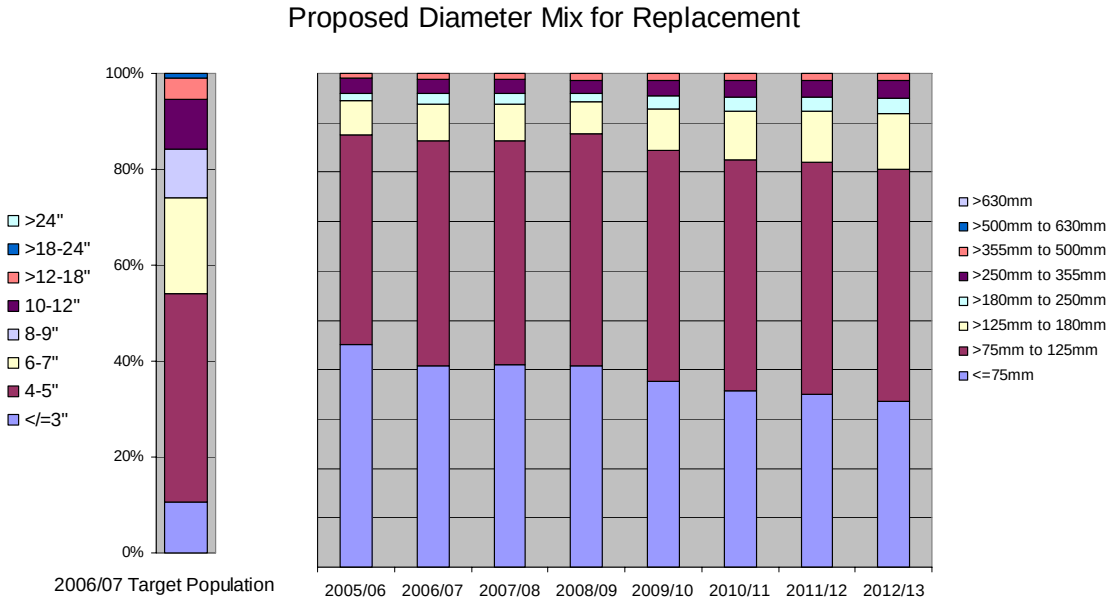

Figure 8-6

We also compared the Network's forecast with that of others and came to the overall conclusion that the forecast diameter mix correct.

Diameter Mix of De-commissioned Mains

We have reviewed the Network's proposal for de-commissioned mains comparing it with the target population. Whilst the Network will give priority to replacing the higher risk mains (mostly smaller diameters) it should also be proportionately addressing the larger diameters. Overall we found reasonable proportionality between the target population and the Network's proposals for these larger diameters.

2006/07 Target Population		1/25th Illustration	Network's Forecast - Abandoned Mains (HSE Programme)							
			2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
1409	</=3"	56	79	73	74	58	47	42	37	33
5851	4-5"	234	300	338	343	377	356	338	334	322
2679	6-7"	107	55	68	69	51	70	92	102	115
1359	8-9"	54	19	12	12	15	23	20	19	20
1394	10-12"	56	10	17	17	11	16	20	20	23
591	>12-18"	24	17	12	12	15	15	15	15	15
119	>18-24"	5	0	1	1	1	1	1	1	1
12	>24"	0	0	0	0	0	0	0	0	0
13413		537	481	520	527	527	527	527	527	527

Table 8-8

Ratio of installed to de-commissioned mains

We have examined the ratio of installed to de-commissioned mains within the proposal and compared this with others. We have assumed upsizing of around 10km/yr, higher than historic levels but in line with overall reinforcement proposals. After taking into account up-sizing (see below) the Network is forecasting an abandoned/installed ratio of 1.1 which we regard as satisfactory.

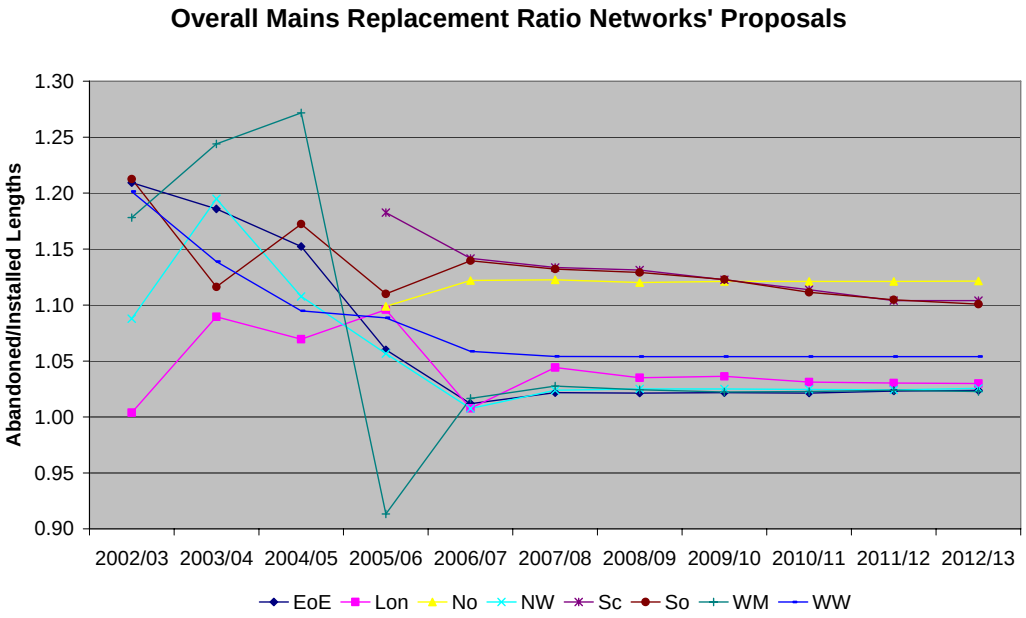

Figure 8-7

Reinforcement and Up-sizing

The Network operates an accounting rule such that (together with other conditions) if a replacement main is greater than 2" larger in diameter (up-sized) it is charged to reinforcement and Capex. Reinforcement and up-sizing can compensate for the loss of capacity caused by inserting new smaller diameter mains and where reinforcement or up-sizing is required, total project costs should be optimised. We are satisfied that the Network routinely undertakes cost-benefit analysis (taking into account pressure raising alternatives and effects on emissions and PREs) and that the forecast levels of associated system reinforcement and upsizing are reasonable and in proportion to the overall programme.

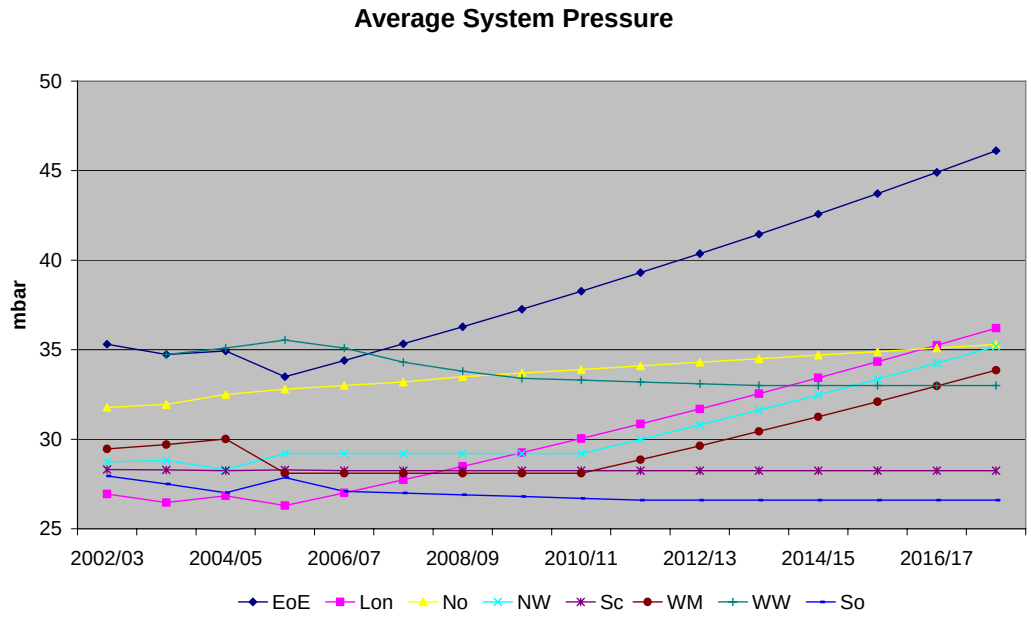

Figure 8-8

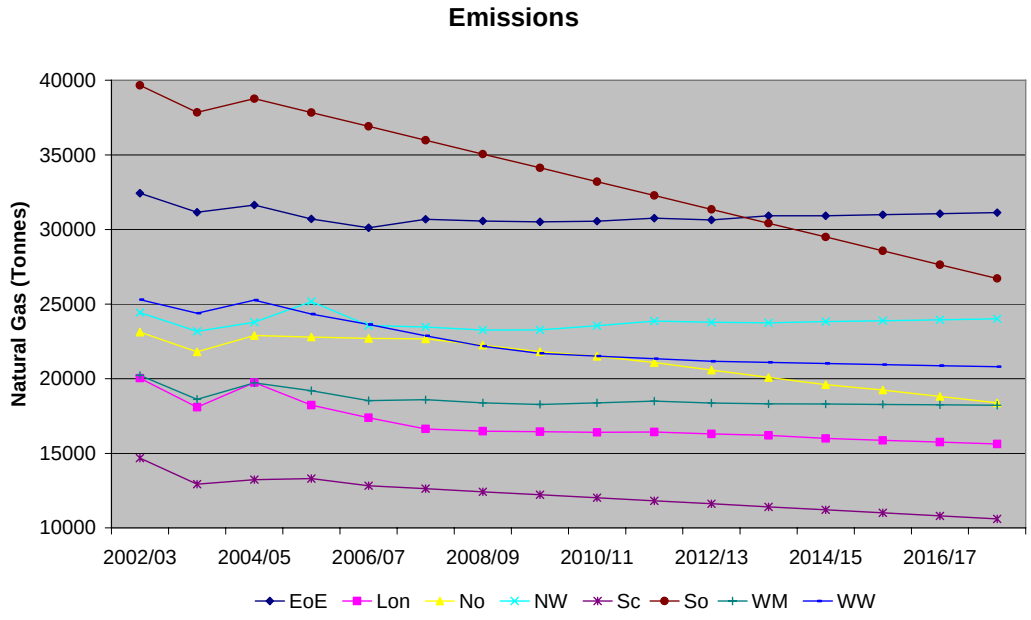

Figure 8-9

Other Policy and Condition Mains

Iron and Steel Mains

We have reviewed the Networks forecast workload relating to Other Policy and Condition Mains and compared it to others. We found the Network's forecast to be in proportion to the rest of its programme and propose no adjustment.

Replacement Services

We have reviewed the Network's forecast for domestic services associated with replacement mains and compared this with historical data to establish the number of services jobs/km of mains abandoned. We have also compared the forecast with others, on a pro-rata basis to mains de-commissioned. We concluded that the network's forecast was reasonable and we propose no adjustment.

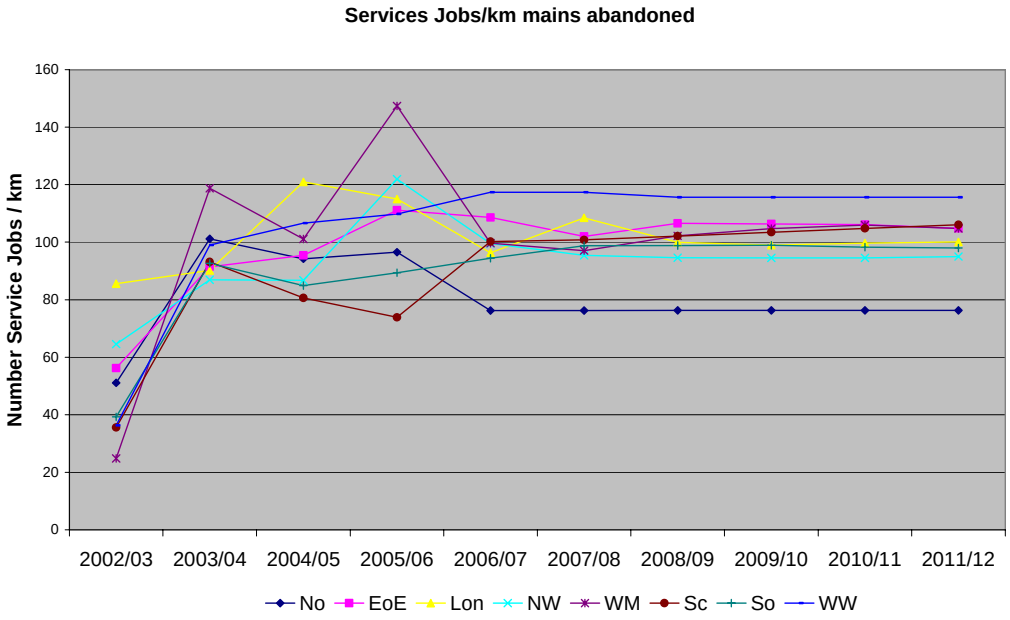

Figure 8-10

We have also reviewed the forecast workload for services relaid after escape and have made a small adjustment each year to reflect the effect of the replacement programme and the declining population of steel services.

Transferred Services

In addition to the overall numbers of services jobs, the mix of relayed and transferred services is a significant cost factor. We compared the proposed proportions with historical data (together with that of other networks) and concluded that the Network had been accurate in the proportion of service transfers forecast.[7]

[7] The Network explained to us that from 2006/07 it had rationalised the recording of (and payment for) transferred services such that those carried out for customer or contractor convenience (as against those essential to the completion of the works) were excluded from its submission. The proportion of transferred services is not therefore directly comparable to other Networks.

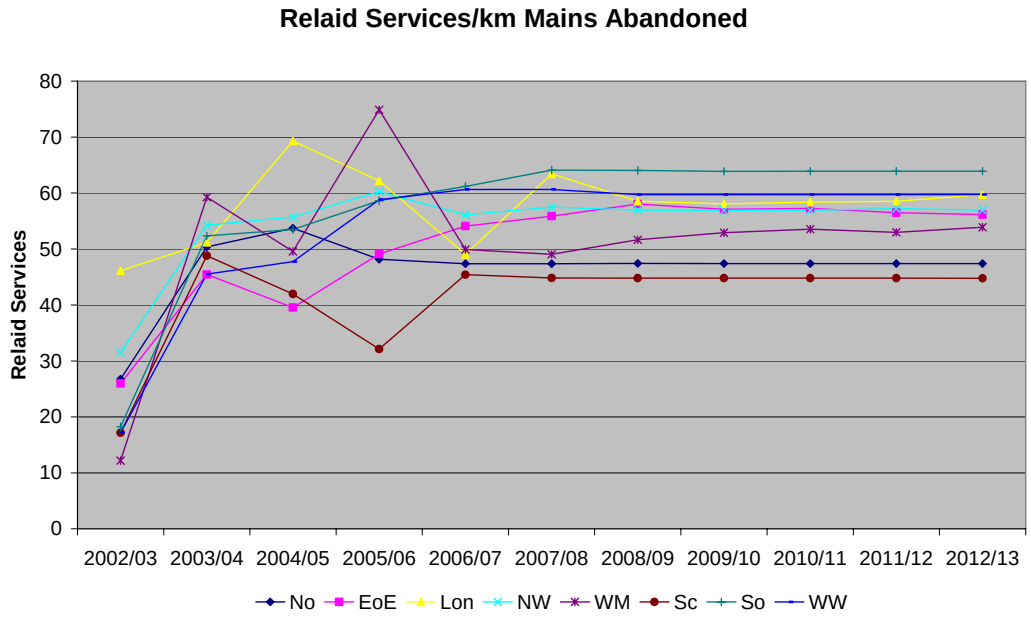

Figure 8-11

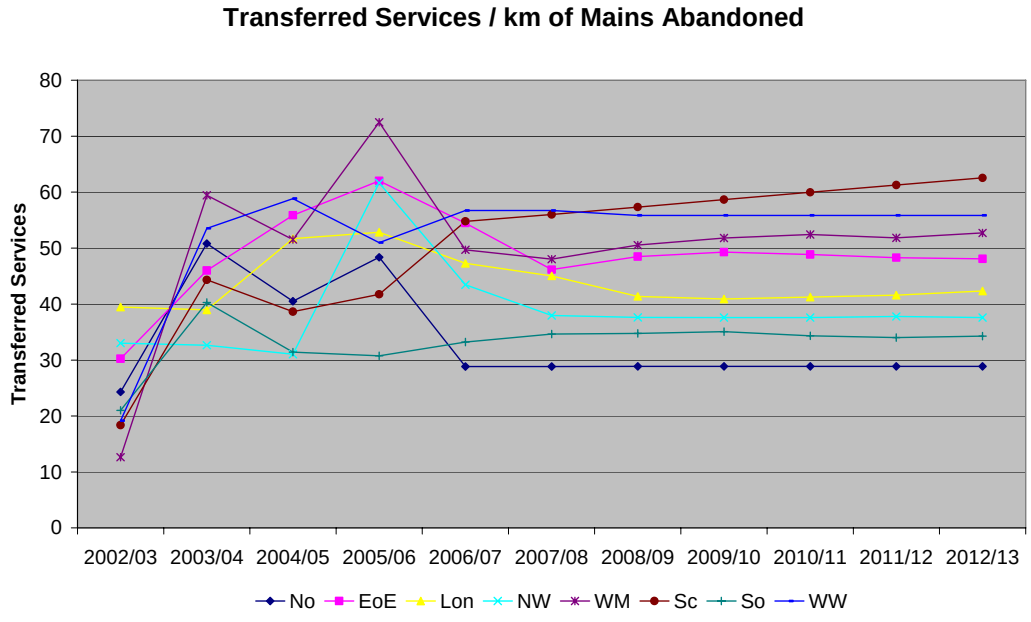

Figure 8-12

Non-domestic Services

Non-domestic services have proved more difficult to assess because the volume history (and cost allocation) is clearly unreliable. However we have accepted the forecast volumes (and costs) as being in reasonable proportion to the domestic services workload and propose no adjustment.

Multiple Occupancy Buildings

The Network has forecast expenditure of £1.3m/year for the replacement of risers & laterals in high-rise blocks.

The Network is right to be considering the condition of these assets and their future, but replacement is relatively expensive on a cost per customer basis and in some cases may not be economically justified.

The Network has a survey (T/PM/LC21; 43% complete) in progress aimed at establishing the population of risers and laterals and their condition. We note however that this survey does not record the number of customers connected nor the use of gas (i.e. cooking, heating etc.) and we recommend that these factors are incorporated so that the consequences of isolation, in the event of an escape that cannot be located or repaired, can be included in prioritising the work.

Ofgem, in its GDPCR Third Consultation Document, has invited views on the issues associated with the replacement of these connections and there may be developments which would enable Networks to follow a process leading to an alternative to replacement in some instances, although it is recognised that there are inevitably costs associated with this option.

We acknowledge that it is appropriate that the Network incorporates multiple occupancy buildings within its replacement programme, however we feel that at present too little is known about the population, its condition, and the consequences of isolation, to prioritise the work or assess the appropriate rate of replacement.

We have therefore recommended expenditure sufficient, in our judgement, to deal with risers and laterals on a replace on failure basis and/or to start some selective replacement. If the Network can provide better data on the population, its condition and the consequences of isolation, it may be reasonable for Ofgem to increase the allowance to accommodate a programme of prioritised replacement.[8]

[8] We have asked all the Networks to provided an update of their survey information and a revised forecast as part of the 2006/07 BPQ update.

GDN Volumes (Adjusted)	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Installed Mains (km)							
HSE Programme	467.2	473.7	474.7	475.9	476.8	477.4	477.9
MPDI Programme	0.9	0.9	0.9	0.8	0.8	0.8	0.8
Non-rechargeable Diversions	4.1	4.1	4.2	4.0	4.1	4.0	4.1
Other Policy & Condition Mains	31.8	32.1	32.2	30.7	29.9	29.3	28.5
Total Installed Mains (km)	**504.0**	**510.8**	**512.0**	**511.4**	**511.6**	**511.5**	**511.3**
Replacement Services - domestic							
Relaid services associated with mains replacement	26784	27156	27198	27187	27188	27193	27190
Relaid services not associated with mains replacement (bulk relays)	100	100	100	100	100	100	100
Services relaid after escape	5883	5883	5795	5708	5622	5538	5455
Service test & transfer to new or other main	16313	16540	16565	16558	16559	16562	16561
Reposition domestic meter - service relays	1524	1524	1524	1524	1524	1524	1524
Purge & relight after domestic service work	48750	49427	49503	49483	49486	49494	49490
Service relay domestic meterwork	0	0	0	0	0	0	0
Other domestic services	416	416	416	416	416	416	416
Total Domestic Services	**99770**	**101046**	**101101**	**100976**	**100895**	**100827**	**100736**
Replacement Services - Non-domestic	**374**	**379**	**379**	**379**	**379**	**379**	**379**
Multiple Occupancy Buildings							
Renew service connections	0	0	342	342	342	342	342
Total riser renewals (m)	0	0	619	619	619	619	619

Table 8-9

Proposed Costs

In section 8.2.4 above we explained how we established the relative position of each Network, the upper quartile and the Network with the lowest unit costs overall.

We expect Networks that are in front of the upper quartile (frontier Networks) to improve by closing the gap with our projection of their costs over the period to 2012/13. Our projection is based on the assumptions at 8.4.5 below and includes a 1.75% per annum productivity improvement. Thus as these Networks improve each year, the upper quartile moves forward, stretching the gap to be closed by those Networks behind.

On-going efficiency improvements

As part of our review we have considered how these efficiencies may be achieved.

Work Delivery

Work is delivered by means of an Asset Services Agreement with United Utilities Operations Ltd (UUOL). Until recently replacement work was primarily undertaken by

Engineering Period Contractors (EPCs) but these have now been replaced by partnership contracting arrangements which the network has recently set up via UUOL.

Target cost arrangements such as these can be effective in reducing costs but we believe that they are best applied to large projects where management can be focussed on cost reduction from design, through work delivery, to project completion.

Project Scale

We have noted from a list of 1300 2005/06 projects provided by the Network that the average project size was just 340m with the largest project 4.0km. We understand that the Network "bundles" the projects into areas to improve efficiency but we feel that a move to substantially larger projects would enable detailed planning and management of the project and improve efficiency. Other advantages of this approach are better management of customer issues (notification, disconnection time, reconnection, internal reinstatement etc.) and traffic and highway occupation times. Large projects also make techniques such as aggregate recycling, and the re-use of excavated material through conditioning more achievable, as well as providing the critical mass for further innovation.

Zonal Replacement

The move to larger projects may be inhibited by the current 20/70/10 approach to project selection and assembly, and the HSE's past insistence that any change in policy should deliver at least as much risk removal.

HSE stated at its 2005 Review " After the first few years of the 30 year programme, the very high scoring mains should have been removed and the order in which the remainder are replaced may not be as significant. HSE see potential safety benefits for increased efficiency to allow higher annual decommissioning targets and improve the effectiveness of the 30 year programme."

Whilst the HSE's primary interest is in risk reduction, in the above statement it also recognises the importance of completing the work efficiently. Whilst HSE also seeks higher annual decommissioning targets, its Enforcement Policy and its selection of the 30 year programme recognise the difficulties associated with faster de-commissioning. In its 2005 Review it recognised (Table 3) that the overall de-commissioning rate was likely to continue at 3,500km/year.

If the Network found that its 20/70/10 approach was inhibiting efficiency, and since a significant quantity of risk has now been removed from the network, the Network could approach HSE with a strategy that removes risk by zone (rather than mains unit) prioritisation (supplemented by the removal of individual high risk pipes as necessary) and at the decommissioning rates required to achieve the programme over the full 30 years.

We note that HSE must approve a programme that is suitable and sufficient and in our view this could reasonably be taken to mean HSE acceptance of methods of prioritisation that are consistent with the high rates of production required to deliver the thirty year programme.

8.4.3 SPECIFIC COST AREAS

Multiple Occupancy Buildings

The cost of replacement risers and lateral connections to apartments within multiple occupancy buildings is influenced by a number of factors. We have reviewed the Network's proposals and compared them with data from other Networks including some examples of completed projects.

The recommended investment is our view of the reasonable cost of a "replace on failure" approach and is based on limited data provided by the Network on its population of these buildings and likely costs.

Changes in the Regulation of the Disposal of Waste

The Network will be exposed to cost increases arising directly from the Landfill Regulations and Landfill Taxes. It will also incur other costs to optimise overall expenditure in this area and minimise waste to landfill.

Improved waste segregation will be required to prevent more of its waste being classified under the Landfill Regulations as "non-hazardous" rather than "inert" as at present. The shift from inert to non-hazardous status is primarily driven by the volume of bituminous materials to be disposed of, either directly, or where inert material has become contaminated with bituminous material making the whole of the contaminated waste non-hazardous and subject to higher disposal charges. In addition, the Environment Agency is becoming more active in enforcing the Landfill Regulations and Landfill Operators are becoming more cautious in accepting material as "inert", causing it to be disposed of as "non-hazardous" at higher cost.

As well as disposal charges, the Landfill Tax charge is currently levied at £2/tonne for inert/inactive waste, with a standard rate of £21/tonne charged for all other waste. The Government has stated that the standard rate for non-hazardous waste will increase by at least £3[9] annually to a rate of £35 in 2010.

The Network has included these higher tax costs within its forecast together with associated costs related to the improved segregation of materials and increases in tipping charges and estimates the effect to be about £1m/annum.

There is considerable uncertainty around the likely change in disposal and tax charges going forward. Variables are:

The volume of waste and the proportion of inert and non-hazardous (and possibly small volumes of hazardous) material for disposal.

The marginal costs of waste segregation and the level, and cost, of recycling achieved.

The cost of testing to establish the status of waste for disposal.

The rate of Landfill Tax due on the waste for disposal.

The Landfill Tax charge in our base year was £18/tonne (Standard Rate) and our analysis has made no allowance for the proposed increases in subsequent years. Nor has any allowance been made for possible changes in the enforcement of the Landfill Regulations.

We therefore recommend that this is treated as an uncertain cost and that an adjustment is made following further assessment.

8.4.4 REAL PRICE EFFECTS

We agree with the Network's view on the likely trend in contractor and material costs but take a slightly different view of RPI +2.25% (contractors) and RPI + 1% (direct labour and materials) each year. This has to be considered in conjunction with our overall productivity assumption of a 1.75% year on year gain, making our view more optimistic overall.

9 Revised to £8 each year to 2011 in the recent Budget statement.

8.4.5 RECOMMENDATIONS

GDN Projected Costs	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Installed Mains							
HSE Programme	42.2	42.5	42.1	43.2	43.7	43.6	43.9
MPDI Programme	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Non-rechargeable Diversions	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Other Policy & Condition Mains	2.5	2.5	2.4	2.3	2.3	2.2	2.2
Rechargeable Diversions	-0.2	-0.3	-0.2	0.1	0.2	0.1	0.1
Total Installed Mains	**44.7**	**44.9**	**44.6**	**45.9**	**46.5**	**46.3**	**46.5**
Replacement Services - domestic							
Relaid services associated with mains replacement	12.9	13.0	13.0	12.9	12.8	12.7	12.6
Relaid services not associated with mains replacement (bulk relays)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Services relaid after escape	2.8	2.8	2.8	2.7	2.6	2.6	2.5
Service test & transfer to new or other main	3.9	3.9	3.9	3.9	3.9	3.9	3.8
Reposition domestic meter - service relays	2.9	2.9	2.9	2.9	2.9	2.8	2.8
Purge & relight after domestic service work	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Service relay domestic meterwork	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other domestic services	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Domestic Services	**23.7**	**23.8**	**23.6**	**23.4**	**23.2**	**23.0**	**22.8**
Replacement Services - Non-domestic	**0.5**	**0.6**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Multiple Occupancy Buildings							
Renew service connections	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Total riser renewals (m)	0.0	0.0	0.6	0.6	0.6	0.6	0.6
Total	**0.0**	**0.0**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**
Total Repex	**69.0**	**69.2**	**69.5**	**70.5**	**70.9**	**70.5**	**70.6**

Table 8-10

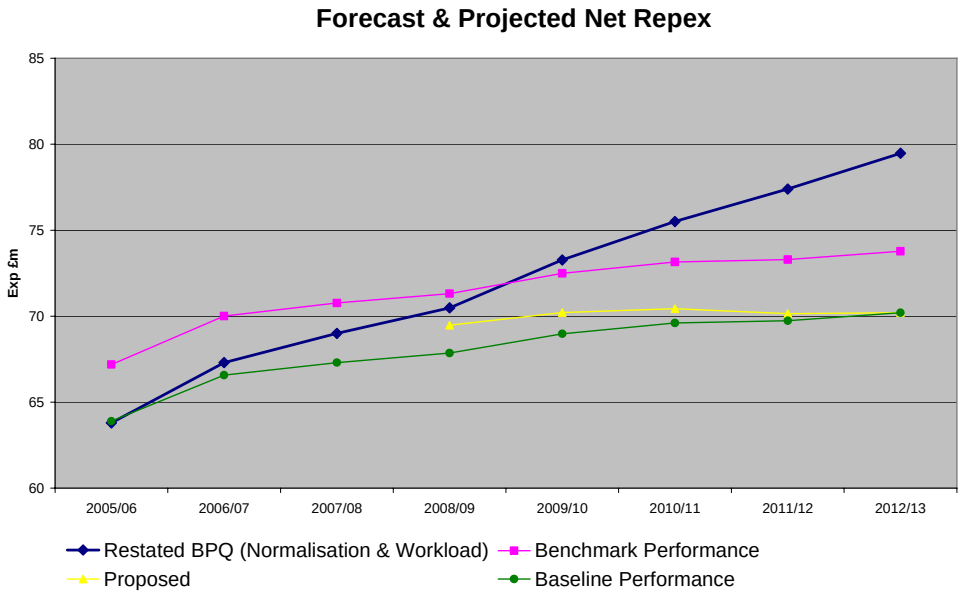

Figure 8-13

8.4.5.1 Supplementary Incentive Mechanism

The Supplementary Incentive Mechanism was introduced within the 2001 Price Control Review to address the "diameter effect" where a workload of smaller (than forecast) diameter mains could produce savings for the Network. The current incentive applies only to mains abandoned and rewards the Network if mains replacement costs are less than the "value" of the mains abandoned. This is calculated annually by multiplying the length abandoned in each diameter band by the appropriate matrix value. Thus the incentive acts to minimise the cost of replacement mains and maximise the mains abandoned.

Operation of the current incentive has raised the following issues:

Rather than simply minimising the cost of replacement mains, the incentive should reflect the need to optimise whole project costs and consider:

i) The cost of replacing the associated services (Repex)

ii) The requirement for system reinforcement (Capex)

iii) The effect on the operating pressure of the network, the level of public reported escapes and emissions/shrinkage (Opex)

We are satisfied that the Network does take these factors into account but we do not think it appropriate that the incentive should continue in its current form as it can be conceived as an incentive to transfer costs to these other areas and as a potential impediment to best practice in network management.

We understand that Ofgem intends to address these issues by including services within the Repex incentive and by equalizing incentives across replacement and other Capex.

We have therefore expressed the recommended expenditure in terms of mains decommissioned. In doing so we have made judgements on the overall ratio of mains installed to mains de-commissioned (as detailed earlier in this report), and the likely diameters of installed mains (and the relative proportions) that contribute to the cost of de-commissioning by diameter band.

We have drawn on data made available to us during this review to allocate proportions of smaller, equivalent and larger diameters of installed pipe to each diameter band of de-commissioned mains. We thus developed a set of standard unit costs which set the relationship of each diameter band. These unit costs were then applied to the projected

volumes to give a total notional cost and a scaling factor when compared to our recommended efficient costs. Standard unit costs were then adjusted and applied to the projected volumes to total to the recommended efficient cost for each year as shown below.

Re-chargeable diversions are excluded as in the current version of the supplementary incentive mechanism

De-commissioned Mains	2008/09			2009/10		
£m (05/06)	Volume (km)	Unit Cost (£/m)	Total £m	Volume (km)	Unit Cost (£/m)	Total £m
</=3"	88.80	57.69	5.12	77.40	56.18	4.35
4-5"	389.60	62.98	24.54	367.90	61.33	22.56
6-7"	52.30	88.61	4.63	72.10	86.30	6.22
8-9"	15.40	163.92	2.52	23.90	159.63	3.82
10-12"	11.50	229.01	2.63	16.20	223.03	3.61
>12-18"	15.10	332.09	5.01	15.10	323.41	4.88
>18-24"	0.80	464.15	0.37	0.80	452.02	0.36
>24"	0.00		0.00	0.00		0.00
	573.50		**44.84**	**573.40**		**45.81**

	2010/11			2011/12		
£m (05/06)	Volume (km)	Unit Cost (£/m)	Total £m	Volume (km)	Unit Cost (£/m)	Total £m
</=3"	72.50	55.63	4.03	67.30	55.29	3.72
4-5"	349.10	60.74	21.20	345.00	60.36	20.83
6-7"	95.10	85.46	8.13	105.30	84.93	8.94
8-9"	20.30	158.08	3.21	19.30	157.11	3.03
10-12"	20.70	220.86	4.57	20.70	219.50	4.54
>12-18"	15.10	320.28	4.84	15.10	318.30	4.81
>18-24"	0.80	447.64	0.36	0.80	444.88	0.36
>24"	0.00		0.00	0.00		0.00
	573.60		**46.34**	**573.50**		**46.23**

	2012/13		
£m (05/06)	Volume (km)	Unit Cost (£/m)	Total £m
</=3"	63.20	54.58	3.45
4-5"	332.20	59.58	19.79
6-7"	118.60	83.84	9.94
8-9"	20.30	155.08	3.15
10-12"	23.20	216.67	5.03
>12-18"	15.10	314.19	4.74
>18-24"	0.80	439.13	0.35
>24"	0.00		0.00
	573.40		**46.46**

Table 8-11

9 LTS REPEX

9.1 SUMMARY

Repex £m (05/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission						
LTS	6.5	27.5	1.5	0.9	0.9	**37.1**
Total	**6.5**	**27.5**	**1.5**	**0.9**	**0.9**	**37.1**
Normalisation Adjustments						
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Normalised BPQ						
LTS	6.5	27.5	1.5	0.9	0.9	**37.1**
Total	**6.5**	**27.5**	**1.5**	**0.9**	**0.9**	**37.1**
Adjustments						
LTS	-0.2	-1.1	-0.1	-0.1	-0.1	**-1.4**
Total	**-0.2**	**-1.1**	**-0.1**	**-0.1**	**-0.1**	**-1.4**
Proposed Repex						
LTS	6.3	26.4	1.4	0.8	0.8	**35.7**
Total	**6.3**	**26.4**	**1.4**	**0.8**	**0.8**	**35.7**

Table 9-1

9.2 POLICIES & PROCEDURES

9.2.1 INTRODUCTION

LTS Repex work falls into two categories. Firstly rechargeable works which are instigated by and paid for by the requesting authority (Local Authority, Highways Agency etc). NGN's policy here is to recover full uplifted costs including any attributable overheads where applicable. Secondly, non-rechargeable works which result from legal requirements to relocate (lift and shift) pipelines under the terms of the easements (e.g. private land, railway bridges), or for 'asset condition' reasons such as corrosion or unstable land conditions (e.g. mining subsidence). Once the work has been identified and categorised the design, procurement, monitoring and control processes are the same as for Capex projects.

9.2.2 SCOPE OF POLICIES AND PROCEDURES

As stated above, the planning and procurement of the actual works will be treated as per Capex projects plus a financial process for ensuring full recovery of costs for rechargeable work.

9.2.3 REVIEW AND UPDATE PROCESS

There is no specific reference in the submission to review processes for LTS Repex projects, but again the processes for Capex controls will apply here. However, third parties dictate a large part of the programme and this often has to override any 'internal' planning process.

9.2.4 EFFICIENCY AND PRODUCTIVITY

All major works identified under LTS Repex will be open market tendered except for small and operationally complex work which may be undertaken by a period contractor on tendered rates.

Usually a replacement project will be more operationally complex than an equivalent capital project as it may need to be done in stages and linked with requirements to maintain gas supplies. Hence unit costs or other such comparators are usually meaningless here.

As with Capex projects, the key to efficient execution is good planning. NGN's listing of LTS Repex work in detail gives confidence that their planning process is sound.

9.3 HISTORICAL PERFORMANCE

9.3.1 ESTABLISH UNDERLYING COSTS

LTS Net Repex All figures £m 2005/06 prices	2002/03	2003/04	2004/05	2005/06	2006/07
BPQ Gross Submission	0.0	0.4	0.2	1.3	0.6
BPQ Capitalised Overheads	0.0	0.0	0.0	0.0	0.3
BPQ Contributions	0.0	0.3	0.3	0.9	0.1
BPQ Net Submission	0.0	0.1	-0.1	0.4	0.8

Table 9-2

LTS Repex work is largely dictated by third parties. Therefore the pre-sale trend cannot be taken as an indication of historical performance or efficiency. Work is tendered to ensure that the lowest cost is procured.

9.4 FORECAST

9.4.1 COMPANY PROPOSALS

The programme of 18 named LTS Repex projects for 2008/09 to 2012/13 is well detailed and costed in the submission. The workload is significant but deemed necessary. The programme is dominated by one large pipeline condition replacement project costing £28m.

[Note: Ofgem are reviewing the accounting policy for large LTS Repex projects with a view to confirming whether this is Repex or Capex]

LTS Net Repex All figures £m 2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13
BPQ Gross Submission	12.0	27.2	1.2	0.6	0.6
BPQ Capitalised Overheads	0.3	0.3	0.3	0.3	0.3
BPQ Contributions	5.8	0.0	0.0	0.0	0.0
BPQ Net Submission	6.5	27.5	1.5	0.9	0.9

Table 9-3

9.4.2 SPECIFIC COST AREAS

Although the year on year expenditure is variable, this is because it comprises a series of one-off projects which occur when they are needed. There will be no meaningful trend.

The programme is dominated by one large pipeline condition replacement project (Catton to Wetherall) costing £28mwith the main construction year being 2009/10. This project

has been discussed at length with NGN and was the subject of four supplementary questions which have been satisfactorily answered.

9.4.3 REAL PRICE EFFECTS

Real prices for this work will follow material and contracting price projections for LTS Capex work and have been adjusted accordingly.

9.4.4 RECOMMENDATIONS

The programme is detailed against named projects and the necessity and scope of these projects are understood and accepted. The requested expenditure for each of the years from 2008/09 to 2012/13 is proposed to be allowed.

APPENDIX 1 FINANCIAL & TECHNICAL POLICIES

A1.1 INTRODUCTION

This section reviews the financial and Technical framework under which Northern Gas Networks operate, the structure it utilises to effectively manage their assets and the key policies it adopts to ensure it meets its Statutory Licence obligations and other legislative requirements.

A1.2 APPROACH

The key policies used by the Network have been reviewed and where appropriate comments are made on our findings.

Purpose -- This sets the context of the Policy under review, how it fits with legal requirements and its financial impact.

Appropriateness -- The Policy is considered for its appropriateness; does it deliver the required outcomes, are financial and/or technical risks adequately managed and does it fit with the Statutory and legal requirements of the Network owner/operator.

Safety and Environment – Does the Policy deal with the safety and environmental risks generated by the assets continued operation. Are these risk clearly understood and documented.

Omissions and Improvements – Outlines any improvements or omissions required of the policy for it to fully meet its declared objectives

Implementation – Has the Policy been written in a way that provides clarity of understanding and consistency of implementation?

The review of policies and procedures for this appendix is not implied to be a full and comprehensive review process which could only be achieved via structured audit programme. The objective is to consider whether the high level objectives of the policy are met and that the content is fit for purpose.

A1.3 FINANCIAL AND TECHNICAL FRAMEWORK

NGN has implemented a business model based on the principles of Strategic Asset Management. Under this model, the roles of asset ownership, asset management and asset services are unbundled with NGN as holder of the Transporters License and Safety Case as well as retaining ownership of the key operational systems relating to the operation and maintenance of the network. NGN has outsourced to United Utilities Operations Ltd. (UUOL) a range of activities previously undertaken within the Network. These predominantly relate to the operation and maintenance of the distribution network and the delivery of capital and mains replacement programmes. The appointment of UUOL was carried out via a competitive tender process. The relationship between NGN and UUOL is governed by an Asset Services Agreement. (ASA)

The key policies and activities of NGN are driven by the legal and regulatory framework in which it sees itself operating. They describe the four principle components of this framework as; the Gas Act; Gas Transporter License; Uniform Network Code; and the Gas Safety Regime.

The principle duties of NGN are set out in Section 9 of the Gas Act. In summary these duties are to:

- Develop and maintain an efficient and economical pipeline system for the conveyance of gas across the network;
- Complying so far as economical to do so with reasonable requests to connect to the system and convey gas by means of that system to any premises;
- Facilitate competition in the supply of gas; and

• Avoid any undue preference or undue discrimination in the connection of premises or other pipelines or in the terms on which it undertakes the conveyance of gas.

Under the Gas Act NGN are required to hold a Gas Transporter licence. Two key obligations of this licence require NGN to;

• have a network code which sets out the transportation arrangements between NGN, the NTS, other GDN's and gas shippers for connection to and use of its pipeline system; and
• maintain security standards for system development. This standard stipulates that the pipeline system must be capable of meeting peak aggregate daily demand that is only likely to be exceeded (whether on one or more days) in 1 year out of 20 years

The Gas Safety (Management) Regulations 1996 require NGN to prepare a Safety Case for acceptance by the Health and Safety Executive. Compliance with their approved safety case is mandatory and the NGN Gas Requirements Manual (GRM) is a depository of the policies and procedures they use to ensure that NGN fulfils its safety obligations, complies with their Transporter Licence and delivers the arrangements necessary to comply with the Safety Case.

An overview of the technical and financial framework within the Network is shown in the diagram below.

A1.3.1 FINANCIAL AND TECHNICAL FRAMEWORK

Board Level

Statutory, legal and regulatory requirements

Financial	Technical
Investment Guidelines	
Budgeting process	Safety Case
Project definition, alternatives etc.	Gas Requirements Manual
Levels of authority	Safety & Technical Competence
Monitoring & control	Policies and Procedures
Re-authorisation of over/underspends	Change Process & authorisation
Project completion	Compliance Audit
PIAs	

The key requirement of this framework is for the Board of NGN to structure and operate the business such that they comply with the statutory, legal and regulatory obligations placed upon them.

A1.3.2 TECHNICAL POLICY FRAMEWORK

The Gas Requirements Manual (GRM) defines the policies used for the engineering of the Network assets, the protection of the public, the well being of their workforce and contractors and the protection of the environment. It is put forward as the key reference document referenced by managers and staff involved in gas engineering activities. The GRM along with the Safety Case describes what they do and how they operate to achieve a safe and reliable gas transportation network.

The GRM covers the following areas:

1. Legislative Compliance
2. Risk Management
3. Control of Documents
4. Change Management
5. Technical Authority Levels: Competence and Behaviour
6. Safe Working Practices and Safe Control of Operations
7. Environment
8. Occupational Health
9. Use of Contractors
10. Gas Escapes
11. Gas Supply Emergencies
12. Gas Quality
13. Metering
14. Incident Reporting and Investigation
15. Network Planning Analysis
16. Records Data Management
17. Network Asset Integrity
18. Distribution Pipe Replacement
19. LNG
20. Audit
21. Security
22. Telemetry

NGN have confirmed that they are still using the NGG version of the GRM but that they are currently developing their own version of this document.

A1.4 POLICY DEVELOPMENT AND CONTROL

Within NGN, engineering and SHE documents are developed and approved within a governance framework which is headed by the Gas Networks Safety and Engineering Committee (GNSEC).

GNSEC comprises of business functional directors including the relevant DN Senior Managers.

[Sec 4.a12 Safety Case]

NGN operate a HS&E governance Group as well as the GNSEC. The GNSEC reports to the NGN Board and the HS&E governance group report to the NGN Executive. Both have close links in the development and control of policy documents.

We believe that NGN are conducting a general review of their P&P's since taking ownership. It is evident however that the majority of P&P's currently in place are those handed over by NG at the point of sale. Where changes are determined as necessary the process is governed by the Gas Requirements Manual Sec 3 Control of Documents and Sec 4 Change Management.

The detailed processes used by NGN in this context can be found in the Management Procedure NGN/PM/GR/2: Management Procedure for the Control of SHE and engineering Documents.

In answer to BPQ 6.144 NGN indicate that they are currently developing procedures based on the principals of PAS55. No timescale is provided for this change to take place.

A1.5 FINANCIAL POLICY FRAMEWORK

The improvement, addition, replacement or maintenance of the Network assets is governed by the Investment Procedures/Guidelines. This sets out how Operational expenditure and capital investment are authorized, controlled, monitored and audited.

The Network Policy for Capital Expenditure (and Acquisitions) is set out in Document PFIN007 (Appendix 6.149 1 yr returns)

This document sets out, at a high level, the key financial controls that govern the investment cycle of NGN Ltd. The overall responsibility for ensuring that capital expenditure is both controlled and spent in the most effective manner lies with the Capital Investment Committee (CIC), supported by the Finance department.

Membership of the Capital Investment Committee comprises:

- Chief Executive Officer
- Finance Director
- Head of Network

and, by invitation, Heads of Department and Project Managers (as required.)

Below the Capital Investment Committee the Investment Screening Group (ISG) of NGN receive all business case submissions for authorisation/sanction of services performed under the Asset Services Agreement (ASA) between NGN and UUOL (see general description above)

Members of the NGN ISG are

- Finance Director, NGN (Chair)
- Network Director, NGN
- Chief Operating Officer, UUOL
- Head of Finance, UUOL
- Head of Operations, UUOL
- Chief Accountant, UUOL

Delegated authority levels are defined and documented within the Network Investment Procedures as are the details for project monitoring and post investment appraisel.

A1.6 FINDINGS

A1.6.1 ENGINEERING AND SAFETY POLICY DOCUMENTS

The various levels of engineering and safety documents together with the associated governance arrangements have been reviewed and subject to the point below, no issues have been found.

As stated in A 1.3 above, NGN are currently developing their version of the Gas Requirements Manual. Until this is done they continue to use the National Grid version which was handed over to Networks at the time of sale.

As the GRM is a prime document which details how, amongst other things, the Networks complies with its Safety Case requirements, we believe this document should be completed and agreed as soon as is reasonably practicable and that a timetable should be set out for the completion of this action.

A1.6.2 TECHNICAL FRAMEWORK

There is clear evidence of a formal and well documented Technical governance process within NGN. Directors and Senior Managers are involved in the major governance groups reviewing and authorising safety, health, environmental and engineering policies. Arrangements are in place to review the impact of changes to legislative requirements and, importantly, to learn lessons from incidents or near misses should they occur.

There are a number of references within various NGN documents that relate to legacy policies and procedures taken directly from the original National Grid Transco suite of policies. Documents in use within NGN have, in a large number of instances, been re-badged, but at this time, other than basic editing, little has been done to review the detailed contents of policies to ensure that;

a) they are appropriate and consistent with the NGN structure and governance processes
b) they are individually signed off as an approved NGN P&P

We believe the Network has embarked on a programme of review of the legacy documents currently in use. (Response to 6.12 One year review) and whilst it is acknowledged that significant other priorities exist at this time feel that a clear timetable should be set out for this process of review and update. The point made in A 1.6.1 above regarding the GRM in use applies in this section also.

Subject to the above minor issues we believe the technical framework for the formulation, implementation and review of SHE and engineering policies and procedures within Northern Gas Networks to be consistent with the sound engineering management and operation of a gas distribution network.

A1.6.3 A 1.6.3 FINANCIAL FRAMEWORK

The documents reviewed show a clear process for budget formulation and approval, financial control and monitoring of investment expenditure. We have found nothing to suggest that the Financial framework within NGN is not consistent with that required within a major company.

APPENDIX 2 NETWORK PLANNING

A2.1 INTRODUCTION

NGN carries out network planning in accordance with the Policy for Network Planning (T/PL/NP/18). This document sets out the policy requirements for network planning activities for use with all natural gas systems operating at pressures up to 100 bar.

For systems above 7 bar, network analysis is carried out using Graphical Falcon. The network validation process is described in Management Procedure for Validation of High Pressure Distribution Network Analysis Models (NP2)

For systems below 7 bar, network analysis is carried out using GBNA. The network validation process is described in Management procedure for the validation of networks with an operating pressure not exceeding 7 bar (NP29).

Systems must be designed to meet the maximum demand growth forecast to be placed upon them at the specified planning horizon.

- For systems operating at pressures not exceeding 7 bar the maximum demand is defined as the appropriately diversified 1 in 20 peak 6 minute demand expressed as an hourly rate.
- For systems operating at pressures exceeding 7 bar the maximum demand is defined as the 1 in 20 design criterion.

In addition, for all systems, where interruptible loads or non-typical loads, particularly seasonal loads, could affect the design of the network an evaluation for conditions away from peak must be undertaken.

The 1 year review investigated the NGN network planning processes and procedures and concluded that the planning work for development of the network and in particular that of the local transmission and storage system has been carried out in a competent manner.

A2.1.1 DIURNAL STORAGE

In the 5 year In this review demand and diurnal storage planning were reviewed in particular.

i) We asked about the demand experience in the years 2004/05 and 2005/06 and the impact on forecasts.

   NGN stated that their forecasts were based on the published 2006 LTDS

   NGN stated that they are moving to base their domestic load band modelling on econometric modelling rather than the ‘added load’ basis that has been used historically. The econometric models would be based mainly on housing development, and to a lesser extent housing populations, provided by an external contract, plus fuel price indicators.

   NGN said that they are aware of the demand side response and have taken account of that in its demand forecasts but continue to plan for 1:20 peak day, which they still consider to be the most appropriate planning guidelines, based on recent industry discussions, which concluded that customer demand response to low temperatures is difficult to predict. They said that it could be argued that given the financial savings made by customers during periods of mild weather, a response to colder than average or even average winter temperatures could result in peak demands being experienced by gas transporters.

   We believe that NGN’s approach to demand uncertainties to be satisfactory.

ii) We asked NGN about their post invesment appraisal (PIA) processes and in particular lessons learnt in relation to LTS projects and how these are reported and disseminated.

NGN said that the final stage in the overall process of capital expenditure control is the post investment review (PIR) of completed projects. A PIR is a process aimed at assessing the efficiency and effectiveness of a capital expenditure decision and management of its implementation. The key objectives are:

- to support continuous improvement in the investment decision and implementation process; and
- to allow for the identification and implementation of corrective actions on the project under review or in similar projects.

On completion of a PIR any identified lessons learnt are built into the project planning packs that are issued to planners. Various project planning packs exist, based on the specific type of project work to be undertaken. Lessons learnt are also discussed at monthly team meetings with the planning teams.

NGN said that PIR reports are requested by, and the results reported to, the Investment Steering Group (ISG), which is chaired by the NGN Finance Director. NGN Finance specifically identify projects to be targeted, based on an agreed set of criteria and lessons learnt are discussed at monthly team meetings with the planning teams. NGN provided a list of the recent projects which were subject to a PIR. NGN said that the ISG maintains a list of lessons learnt and provided a copy of the latest version.

We believe this approach to be satisfactory.

iii) NGN provided an overview of the process of calculating diurnal storage volumes and details of the maximum volume of diurnal storage required and express this as a % of the 1 in 20 peak day demand in each year.

NGN described the parameters are changed each year to reflect the most recent set of operating conditions. The new data is obtained from the Demand Forecasts and from DNCC (Distribution National Control Centre).

Having been checked for accuracy, the data is assigned to the model and analysis is carried out and compared with the previous year's results to ensure no obvious errors exist. Sensitivity analyses are also used to validate the SSM requirement including different forecast error patterns and is a comparison of the stock usage through the previous winter with last year's SSM value for 1 in 20 conditions.

The following table shows the differences storage values, expressed as a percentage of peak demands.

Diurnal storage (% of peak demand)	Period 2008/09 to 2012/13
North East	
SSM value	17.0% (excludes BP Saltend load)
Final value	17.0% (excludes BP Saltend load)
North	
SSM value	15.50%
Final value	15.50%

Table A2-1

NGN said that the SSM is the preferred tool for identifying storage requirements and is always be used for planning purposes. No other value is being used in NGN.

iv) It is noted that the rising system pressures planned by NGN in its distribution system over the 5 year control period will increase the importance and frequency with which network validation needs to be carried out.

APPENDIX 3 PROCUREMENT & LOGISTICS

A3.1 INTRODUCTION

Following on from the one year review a further review and assessment of the procurement and logistics operation within NGN has been completed to ascertain whether or not the strategic approach and process is robust and effective in managing costs whilst maintaining security of supply.

Since the sell off of the Networks by National Grid, the new networks including NGG have a different market place in which to procure goods, services and works to support their business. There is no longer the advantage of large volume and single buyer status, so it is therefore crucial for the Network Companies to look for ways through procurement and logistics to obtain the best market solution possible for their particular needs and minimize costs.

A3.2 SOURCING STRATEGY

NGN outsource their Procurement to United Utilities Operations Ltd. By using UUOL they are able to procure on behalf of the group and therefore use their larger volumes as leverage when going out to the market a good example of this is their PE contract.

A3.3 STRATEGIC PURCHASES

A3.3.1 MAINS AND SERVICE LAYING

NGN through UUOL have now entered into one collaborative partnership (Balfour Beatty/Morgan Est) which has 3 delivery contractors, Balfour Beatty, Morgan Est and Enterprise.

The contract is based on an Actual versus Target Cost, Shared Risk and Reward Model. The contract strategy demonstrates several opportunities to reduce costs. Due to the length of time that this contract has been in place there is not measurable cost information available at this time, so it is therefore not possible to understand whether or not the strategy adopted has been successful from a financial perspective.

NGN have stated that they will have incurred exceptional costs this year during the handover and mobilisation period. These costs have not been specifically identified and should only be one offs.

The principles of the contract should result in cost reduction and continuous improvement.

A3.3.2 CONNECTIONS

NGN through UUOL has entered into a partnership contract with a subsidiary of UUOL.

The procurement process detailed in the evidence provided demonstrates that a thorough process was undertaken. The contract in place is an actual versus Target Cost, Shared Risk and Reward model. The requirements of the contract and the way it is designed to operate if successful should be cost effective and incentivise the contractor and NGN to continuously improve and reduce costs.

A3.3.3 BULK PURCHASES

Specific information was requested with regard to the purchase of vehicles, Telecoms, Office Security, Furniture and Tools & Equipment. NGN stated that all purchases are subject to UU's purchasing procedures but no specific details have been provided relating to the status of the bulk purchases that were specifically referred to in the question, therefore no comment can be made on the cost effectiveness of these purchases.

A3.4 SECURITY OF SUPPLY

NGN appear to have a robust set of contingencies in place for out of stock situations.

NGN carry stock of smaller items in their Network and maintain levels based on historical usage and therefore have a buffer stock so they can react if the items are not available from the supplier. If an item is out of stock they look for an alternative where there is flexibility between types of approved fittings.

Many large Capex and Repex projects are planned months in advance and so there is the potential to plan work around difficult lead times, use other suppliers or in the worst case redesign.

There are also collaboration arrangements in place between the DNs to maintain certain high value strategic items on a national basis.

A3.5 LABOUR SHORTAGES

NGN are proactive in trying to address the skilled labour shortages in the industry. They are converting contract first call operatives and contractor mates (GD1s) into direct labour. They have also put long term agreements in place with their contractors to allow for investment in training.

A3.6 SUMMARY

NGN have provided evidence that demonstrates that they have a good procurement and logistics process via their Assets Service Agreement with UUOL and their logistics provider NRG2.

The contracts set up by UUOL have KPIs and targets that mirror the ASA that UUOL have with NGN therefore supporting UUOL to meet their targets through the supply chain and ultimately meet the objectives of NGN.

Due to their Group purchasing power they have an advantage in the market place for a high percentage of their strategic, high volume, and/or high value purchases and should therefore be able to buy competitively. Their strategies for both Connections and Mains & Service laying contracts demonstrate positive principles that can work if the contracts are managed effectively.

APPENDIX 4 GTMS/SOMSA EXIT PLANS

A4.1 INTRODUCTION

In February 2003, NG announced a 2-year program of Gas Distribution Control centralisation from 4 centres into a single UK control centre at Hinckley. The activity was to be carried out as part of the Control Centre Development Project (CCDP) an encompassing program that moved the gas national control centre to a new purpose built facility in Warwick.

The Distribution National Control Centre (DNCC) was opened in summer 2005 with full UK gas distribution control undertaken from Hinckley.

The Gas Transportation Management System (GTMS) is the Supervisory Control & Data Acquisition (SCADA) System that Controls the combined UK Distribution Networks. Originally, the System was to be replaced as a part of the roll out of the Transmission Control System; the iGMS project. However, a new iGMS for Distribution Control was removed from the program. The logic of the curtailment was entirely due to a change in focus of the NG business. Originally seen as a fully integrated system involving UK gas control, the company faced business separation issues as a result of Network sales, which rendered iGMS, for distribution, as an unfeasible option.

Given the backdrop of the issues of business separation the decision was then taken to alter the business ownership of DNCC moving management responsibility to Distribution, Network Strategy. The function of Distribution control is performed from Hinckley, which is wholly owned and operated by National Grid, with an agreement to operationally service all independent networks under a contract. That contract, known as SOMSA – System Operation Managed Service Agreement – is for all Operating services required for any given network.

A4.2 GMTS REPLACEMENT

GTMS is old technology based upon a Logica system dating from the mid 1980's. The System has been enhanced in house by NG over the years since its inception and has been used in its current form since 1996. However, one of the drivers for iGMS was the age of the GTMS product. GTMS spares availability is limited and there are issues of unsupported software by the manufacturer. NG undertook and completed work to establish the viability of continued running & support; the outcome was that it was considered unsustainable beyond 2009 and that a new System must be sought as a matter of some urgency. Investigation was undertaken into the possibly of moving the system to new computer hardware. Unfortunately, GTMS programmes are also embedded into the Operating System; a system that is not supported by the manufacturer.

A project was therefore established to keep GTMS functioning until 2009, the Prolonged Active Life (PAL) and a second project to replace GTMS was given approval in autumn 2005. Work was undertaken to provide a replacement specification on a modern platform, put the specification to market and engage a suitable contractor. After some 10 months of work SERCK controls was chosen from a shortlist of 4 companies.

The Distribution National Control System (DNCS) Project aims to replace GTMS with a like for like System but on a modern and sustainable platform and at the least possible cost to the industry as a whole.

A4.3 NETWORK SALES

The sale of distribution networks had a profound effect on gas distribution control for all parties, Distribution Networks and Control staff.

It was clear at the outset that given the safety elements associated with gas control and the difficulties to unpick control operations that handling distribution control for the newly

formed businesses would be extremely difficult. An agreement (contract) was developed, referred to earlier as SOMSA. A team was established at Hinckley who constructed, trained staff on and issued industry standard procedures for use by Network and control staff alike. The agreements were established between NGG and all other network owners. However, the SOMSA has always had a finite lifespan and a clear condition of the sale was that control should pass to the new owners. The costs associated with this transfer being factored into the sales process. To allow for the planning of the transfer post sales, Ofgem allowed a relinquishment of operational control for an initial period until March 2008, with the possibility of an extension beyond this stage subject to clear exit planning.

The agreement includes the provision of data and access to Systems to facilitate the transfer of control; however, it specifically excludes the provision of a SCADA System.

A4.4 AGREEMENT TO WORK TOGETHER

Following sales all owners reviewed the options for the provision of a new SCADA system to enable control to be passed back to the new owners. The owners all came to the conclusion that a collaborative approach to replacing the GTMS was the best way forward. Having considered the options available we would support this approach, although risk management is essential to ensure such a collaborative approach does not have difficulties in management and decision-making. It can be stated that we feel some of the risk factors are mitigated by a like for like arrangement in that the specification will be clear.

The approach was to replace the system, initially at Hinckley, and once proved robust further phases would establish the same system at the new owner locations and transfer from Hinckley would then be made.

A governance process has been adopted with an overarching program board to cover all activities associated with SOMSA exit of which GTMS replacement was one of several activities and has it's own project board and governance.

It is clear from the governance structure that SOMSA Exit is the goal with GTMS replacement as an enabler.

Network Owners need to provide their own project management delivery organisation to dovetail into the collaborative project.

Each owner has expressed a wish to exit. Early indications are a timetable as follows:

- Summer 2008 SGN
- Spring 2009 NGN
- Autumn 2009 WWU

However, there are no detailed transfer plans in place with NG for the transfer of operation. The owners continue to jointly work together to identify and understand the exact extent of the activities that would have to be completed by all participants.

APPENDIX 5 REFERENCE UNIT COST OF DIURNAL STORAGE

This appendix sets out the basis for the reference unit cost of diurnal storage used in the PB Power cost assessment.

Based on the unit pipeline costs set out in Appendix 6, the following graph shows the typical unit cost of linepack storage over a notional pressure range of 20 bar. The actual pressure range for a diurnal storage project can be higher or lower than 20 bar depending on the particular circumstances and location.

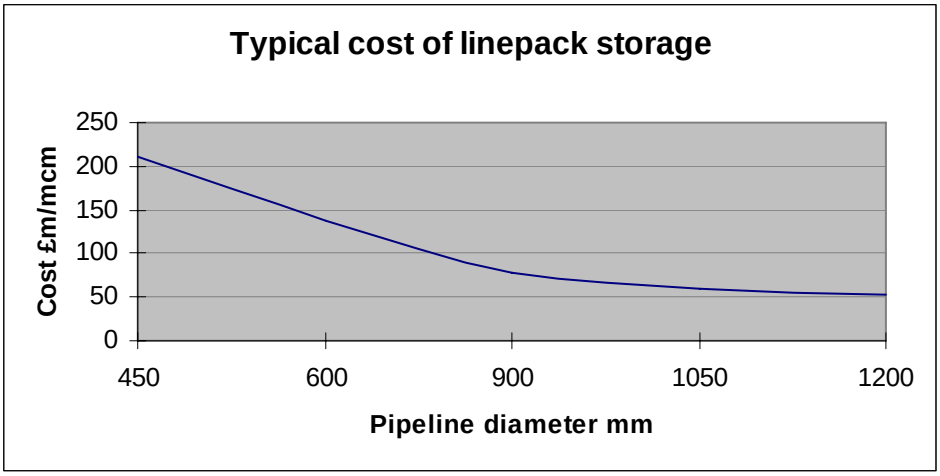

Figure A5- 1

The graph shows that the unit cost of diurnal storage reduces with pipeline diameter. The NTS uses larger diameter pipelines almost exclusively and so the cost of diurnal storage from the NTS will be around the £50m per mcm shown for a 1200mm diameter pipeline.

The GDN plans also show a movement towards larger diameter pipelines and so there will tend to be some convergence between the unit costs of storage from the LTS and from the NTS. However, the unit cost of pipeline construction for NTS project may be less than for LTS projects because of economies of scale, and so units cost of NTS storage may well be below the £50m/mcm in some cases.

Also in some cases the pressure cycling range of LTS (or NTS) projects can be substantially in excess of the 20 bar assumed here in which case the unit cost of LTS (or NTS) storage can be well below the £50m/mcm level.

We believe that a reference unit cost of £50m/mcm is reasonable for the assessment of GDN diurnal storage projects.

Economic storage

Based on the above analysis we have classified diurnal storage projects as follows:

- Economic: Projects with a unit cost of £50m/mcm or less. (The classification of a project as economic does not mean that there is necessarily a need for the project)
- Marginally economic: Projects with a unit cost of between £50m/mcm and £100m/mcm.
- Not economic: Generally, projects with a unit cost of over £100m/mcm. However, there may be exceptional local transmission constraints which might justify including projects in this category in the plan if evidence of such circumstances is provided.

APPENDIX 6 LTS PIPELINE UNIT COSTS

We have reviewed the costs of LTS pipeline projects over the period 2002/03 to 2012/13 which were reported in the BPQ submissions by the GDNs to establish unit costs of different diameter pipeline projects for cost projection purposes.

The following graph shows the data points derived from the BPQ submissions and used in the analysis. It also shows the PB Power unit costs assumptions.

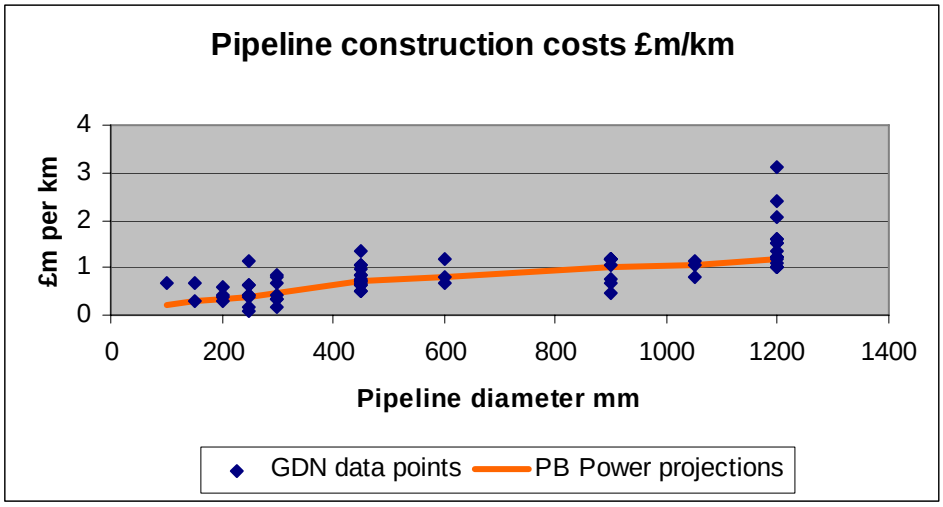

Figure A6 - 1

All the data points have been adjusted to 2005/06 price levels and RPEs assumptions have been removed from future project costs.

In selecting our proposed unit costs, we have taken the median values at each pipe diameter and made adjustments to give an increasing trend in unit costs consistent with the step changes in diameter. For the largest pipe diameter (1200mm) we have taken the lower quartile value since the data set included projects with particular route difficulties where individual adjustments for such factors would be appropriate.

We recognise that individual project costs will reflect specific features of the route such as road, rail and river crossings. We also recognise that some project costs have included additional plant such as PRSs. We have removed costs in certain cases but the analysis has not been detailed enough to ensure full consistency. The PB Power projections may therefore represent pipelines with route features giving project cost above average.

The following table shows the PB Power unit costs by pipe diameter used for cost projection purposes.

Pipeline diameter (mm)	PB Power projection (£m/km)
200	0.35
300	0.45
450	0.70
600	0.80
900	1.00
1050	1.05
1200	1.20

Table 6A - 1

The cost are at 2005/06 prices and exclude the PB Power RPE effects which are added separately in the expenditure assessment.

APPENDIX 7 REGIONAL FACTORS

A7.1 BCIS REGIONAL & COUNTY FACTORS

The Regional and County Factors is published by BCIS, a trading Division of the Royal Institute of Chartered Surveyors (RICS). The figures published in October 2006 have been adapted in order to generate a suitable regional factor index for each GDN for comparison purposes for the review.

The county indices have been modified to remove Orkney Islands Area, Shetland Islands, Northern Ireland and the Channel Islands from the figures. Counties have been allocated to GDNs and where they fall between two GDNs and estimate of the spilt between the GDNs has been made.

The table below lists the Counties which have been split between GDNs and the allocation which has been assumed for each GDN.

COUNTY	WW	No	So	EoE	Lon	NW	WM
Cumbria		70%				30%	
South Yorkshire		50%		50%			
Essex				70%	30%		
Hertfordshire				90%	10%		
Berkshire			75%		25%		
Buckinghamshire			75%		25%		
London Postal Districts			50%		50%		
Outer London			35%	30%	35%		
Hereford and Worcester	20%						80%
Cheshire						80%	20%

Table A7- 1

The regional factor for the GDN is calculated as a weighted average of the total county factors based on the sample sizes. The BCIS data includes a sample size for each county together with the factor for that county. Where the Counties are considered to fall into one or more GDN footprint we have estimated the proportion of the County sample which should be allocated to each GDN. (For example the sample size for London Postal Districts in the BCIS data is 528, we have estimate that this County should be split 50% to each of London and Southern GDNs, therefore sample sizes of 264 have been allocated to each GDN)

For each GDN a weighted average factor is then calculated. The resulting tables used to produce the GDN indices are given below.

Wales & West	Network/ County Factor	Sample Size
Avon	1.02	92.0
Cornwall	0.99	103.0
Devon	0.99	163.0
Gloucestershire	1.02	73.0
Somerset	0.99	74.0
Hereford and Worcester	0.94	23.8
Clwyd	0.87	50.0
Dyfed	0.94	36.0
Gwent	0.92	52.0
Gwynedd	0.89	23.0
Mid Glamorgan	0.91	54.0
POWYS	0.90	23.0
South Glamorgan	0.93	46.0
West Glamorgan	0.89	31.0
Network Value	**0.96**	**843.8**

Table A7- 2

Northern	Network/ County Factor	Sample Size
Cleveland	1.02	62.0
Cumbria	1.05	44.1
Durham	1.01	113.0
Northumberland	1.04	46.0
Tyne Wear	1.01	172.0
Humberside	1.00	104.0
North Yorkshire	1.03	92.0
South Yorkshire	1.01	63.5
West Yorkshire	1.00	212.0
Network Value	**1.01**	**908.6**

Table A7- 3

Scotland	Network/ County Factor	Sample Size
Borders Scotland	0.99	18.0
Central Scotland	0.98	32.0
Dumfries & Galloway	0.93	23.0
Fife	0.96	62.0
Crampian	0.90	134.0
Highland	0.93	42.0
Lothian	1.02	131.0
Strathclyde	1.03	363.0
Tayside	0.98	85.0
Network Value	**0.99**	**890.0**

Table A7- 4

Southern	Network/ County Factor	Sample Size
Kent	1.05	215.0
Surrey	1.10	151.0
East Sussex	1.05	119.0
West Sussex	1.04	118.0
Berkshire	1.04	100.5
Buckinghamshire	1.03	135.8
Hampshire	1.01	293.0
Isle of Wight	1.00	18.0
Oxfordshire	0.99	104.0
London Postal Districts	1.18	264.0
Outer London	1.10	112.0
Dorset	1.02	96.0
Wiltshire	1.01	94.0
Network Value	**1.06**	**1820.3**

Table A7- 5

East of England	Network/ County Factor	Sample Size
South Yorkshire	1.01	63.5
Derbyshlre	0.94	120.0
Leicestershire	0.94	92.0
Lincolnshire	0.94	81.0
Northamptonshire	1.00	123.0
Nottinghamshire	0.93	135.0
Cambridgeshire	1.04	185.0
Norfolk	0.98	102.0
Suffolk	1.01	109.0
Bedfordshire	1.02	71.0
Essex	1.02	152.6
Hertfordshire	1.06	117.0
Outer London	1.10	96.0
Network Value	**1.00**	**1447.1**

Table A7- 6

London	Network/ County Factor	Sample Size
Essex	1.02	65.4
Hertfordshire	1.06	13.0
Berkshire	1.04	33.5
Buckinghamshire	1.03	45.3
London Postal Districts	1.18	264.0
Outer London	1.10	112.0
Network Value	**1.11**	**533.2**

Table A7- 7

North West	Network/ County Factor	Sample Size
Cumbria	1.05	18.9
Cheshire	0.92	127.2
Greater Manchester	0.93	297.0
Lancashire	0.93	167.0
Merseyside	0.94	175.0
Network Value	**0.93**	**785.1**

Table A7- 8

West Midlands	Network/ County Factor	Sample Size
Hereford and Worcester	0.94	95.2
Shropshire	0.93	79.0
Staffordshire	0.91	133.0
Warwickshire	0.96	96.0
West Midlands	0.94	318.0
Cheshire	0.92	31.8
Network Value	**0.94**	**753.0**

Table A7- 9

APPENDIX 8 DATA TABLES & REGRESSION

A8.1 INTRODUCTION

Much of the data entered into the BPQs submitted in October 2006 has been transferred to a database format within Microsoft Excel.

The format allows the data to be manipulated in a number of ways to enable PB Power to determine the appropriate analysis mechanism for each activity.

The sections below give explanations and worked examples of the data calculations use on our analysis.

A8.1.1 ANALYSIS USED

There are three principal forms of analysis which have been carried out to make the projections for our proposals.

The first uses regression analysis to carry out comparisons between the costs and workloads of each GDN. The projection is based on a base year of either 2005/06 or 2006/07 using workloads to project our proposals for the full control period. The GDN's own proposals are used as a test against our own projections.

The second method makes use of the GDN's own proposals across the whole period. In order to use the GDN's proposals we first remove the GDN's own assumptions for RPEs. We then form a view on the workloads and costs applying adjustments we consider appropriate. Finally PB Power's assumptions for RPE are then applied to create the final proposal.

Finally PB Power has also made use of bottom-up analysis where regression was not appropriate or to support the use of regressions.

A8.1.2 REGIONAL FACTORS

Regional factors have been considered to impact the costs of activities carried out in the network, unless specifically stated otherwise. Costs are disaggregated into the four categories of Contractors, Direct Staff/Overheads, Materials and Other. Regional factors have been applied to Contractor and Direct Staff costs. No regional factors have been applied to materials or other expenditure.

A8.1.3 RPE ADJUSTMENTS

Northern assumptions for RPEs used in the analysis are shown in the table below

Contractors	Direct Staff	Materials	Other
4.00%	2.00%	2.00%	0.00%

Table 8A - 1

PB Power assumptions for RPEs used in the analysis are shown in the table below

Contractors	Direct Staff	Materials	Other
2.25%	1.00%	1.00%	0.00%

Table 8A - 2

A8.2 WORKED EXAMPLE

A worked example is given below for the Connections work activity. Many of the principles of the data calculations are similar for other work activities, where different techniques are used these are detailed under the appropriate activity heading.

A8.2.1 EXPLANATION OF THE COSTS AND VOLUME INPUTS TO THE REGRESSION ANALYSIS.

For Connections the regression analysis has been carried out on the 2006/07 data although for other activities 2005/06 has been used as the base year. Full details of the reasoning behind the choice of base year are given in the main report under each activity.

Steps for tracking the data – example Connections

From the BPQ the Connections costs submitted have been taken as below

Gross + Overheads

£m	Gross	Overheads	Total
District Governors	0.05	0.00	0.05
Existing Housing Mains>180mm	0.08	0.00	0.08
Existing Housing Services	8.86	0.31	9.16
Feeder Mains >180mm	0.00	0.00	0.00
New Housing Mains >180mm	0.17	0.01	0.18
New Housing Services	1.75	0.06	1.81
Non-Domestic Mains >180mm	0.36	0.01	0.37
Non-Domestic Services	3.63	0.12	3.75
Service Governors	0.13	0.00	0.13
Specific Reinforcement Mains >180mm	0.26	0.01	0.27
New Housing Mains <=180mm	1.91	0.06	1.97
Existing Housing Mains <=180mm	1.31	0.04	1.35
Non-Domestic Mains <=180mm	0.96	0.03	0.99
Feeder Mains <=180mm	0.00	0.00	0.00
Specific Reinforcement Mains <=180mm	1.24	0.04	1.28

Table 8A - 3

Using both the appropriate regional factors (RF) and the expenditure analysis the figures have been disaggregated into expenditure for Contractors, Direct + Overheads, Materials and Other

GDN Regional Factor	Contractor	Direct
Northern	1.01	0.98

Table 8A - 4

Direct	Contract	Materials	Other
0%	80%	20%	0%

Table 8A - 5

e.g. **8.86 x 0.8 / 1.01 = 7.00**

£m	RF Contractor	RF Direct/ Overheads	RF Materials	RF Other	RF Total
District Governors	0.04	0.00	0.01	0.00	0.05
Existing Housing Mains>180mm	0.06	0.00	0.02	0.00	0.08
Existing Housing Services	7.00	0.31	1.77	0.00	9.08
Feeder Mains >180mm	0.00	0.00	0.00	0.00	0.00
New Housing Mains >180mm	0.13	0.01	0.03	0.00	0.17
New Housing Services	1.38	0.06	0.35	0.00	1.79
Non-Domestic Mains >180mm	0.28	0.01	0.07	0.00	0.37
Non-Domestic Services	2.87	0.13	0.73	0.00	3.72
Service Governors	0.10	0.00	0.03	0.00	0.13
Specific Reinforcement Mains >180mm	0.20	0.01	0.05	0.00	0.26
New Housing Mains <=180mm	1.51	0.06	0.38	0.00	1.96
Existing Housing Mains <=180mm	1.03	0.04	0.26	0.00	1.33
Non-Domestic Mains <=180mm	0.76	0.03	0.19	0.00	0.98
Feeder Mains <=180mm	0.00	0.00	0.00	0.00	0.00
Specific Reinforcement Mains <=180mm	0.98	0.04	0.25	0.00	1.27
					21.19

Table 8A - 6

Natural Log of this **ln(21.19) = 3.05**

This cost figure is used in the regression analysis along with the equivalent values for other GDNs (See table 8A-10).

A8.2.2 WORK DRIVER

The workload is weighted by a standard monetary unit value for each activity :

Activity	Unit Value	Units
Existing Housing Mains>180mm	0.14	£ 000s/m
Existing Housing Mains <=180mm	0.11	£ 000s/m
Feeder Mains >180mm	0.16	£ 000s/m
Feeder Mains <=180mm	0.12	£ 000s/m
District Governors	0.02	£ m/Governor
Service Governors	0.002	£ m/Governor
New Housing Mains >180mm	0.11	£ 000s/m
New Housing Mains <=180mm	0.085	£ 000s/m
Non-Domestic Mains >180mm	0.14	£ 000s/m
Non-Domestic Mains <=180mm	0.11	£ 000s/m
Specific Reinforcement Mains >180mm	0.25	£ 000s/m
Specific Reinforcement Mains <=180mm	0.15	£ 000s/m
Existing Housing Services	0.0009	£ m/Service
New Housing Services	0.0005	£ m/Service
Non-Domestic Services	0.0015	£ m/Service

Table 8A - 7

Multiply by workload volumes

e.g. New Housing Services **4000 x 0.0005 = 2.0**

The workload volume for each activity is multiplied by the unit cost listed above and summed. For Connections gives a total weighted workload driver of 17.77

Natural Log of this **ln(17.77) = 2.88**

Again this figure has been used in the regression analysis.

A8.2.3 REGRESSION TABLE

The complete Connections regression table is given below:

GDN	2006/07	
	Volume	Cost
EoE	3.00	3.24
Lon	2.48	2.85
No	2.88	3.05
NW	2.34	2.72
Sc	3.15	3.20
So	3.20	3.30
WM	2.06	2.39
WW	2.99	3.11

Table 8A - 8

On all regression charts the volume driver is plotted along the x-axis and cost against the y-axis.

From this regression table the regression line is obtained and an upper quartile benchmark calculated as the target.

The regression formula takes the form ***Slope*** x ln(***Volume***) + ***Intercept*** = ln (***Cost***)

Regression Formula **0.729785 x ln(Volume) + 0.967332 = ln(Cost)**

Benchmark Formula **0.729785 x ln(Volume) + 0.926086 = ln(Cost)**

A8.2.4 COST PROJECTIONS

Having calculated the benchmark regression formula for the base year, the ***intercept*** of this formula is reduced each year by the PB Power assumptions for productivity improvements.

Year	Intercept
2005/06	0.93
2006/07	0.93
2007/08	0.90
2008/09	0.87
2009/10	0.83
2010/11	0.80
2011/12	0.77
2012/13	0.74

Table 8A - 9

The formula is then used each year, with the work driver, to calculate the regionally adjusted cost for the total workload. This total is broken back into the individual activities in proportion to the weighted workload driver for each activity.

	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Weighted Workload	17.769	17.681	17.807	18.116	18.459	18.883	19.167
Benchmark	20.615	19.924	19.426	19.082	18.765	18.506	18.148
Baseline	21.187	20.477	19.966	19.612	19.286	19.019	18.651
Gap	0.572	0.553	0.539	0.530	0.521	0.514	0.504
Line A	30%	42%	53%	65%	77%	88%	100%
Line B	100%	88%	77%	65%	53%	42%	30%
Convergence	0.572	0.488	0.413	0.344	0.278	0.214	0.151
Proposed (Ex RPE & RF)	21.187	20.413	19.840	19.426	19.043	18.720	18.299

Table 8A - 10

In the example of Connections the 2006/07 calculation is performed as follows:

0.729785 x ln(17.77) + 0.926086 = ln(22.62)

A similar calculation is performed for each year and also for the baseline performance.

The gap between the baseline performance and the benchmark performance is calculated and a convergence is calculated using the percentages in either Line A or Line B in table 8A-12. If the gap figure is negative line A percentages are used; if the gap figure is positive line B percentages are used. The convergence element is added to the benchmark figure to produce the proposed cost (prior to regional factors and RPE adjustments being applied).

In order to reapply regional factors and PB Power's assumptions for RPEs the average of 2nd and 3rd placed GDNs breakdown expenditure percentages for Contractors, Direct/Overheads, Materials and Other has been used.

A8.3 LTS CAPEX

A8.3.1 ANALYSIS USED

Regression analysis was not deemed appropriate for the LTS Capex expenditure analysis. Our proposed projections are derived from a review of the specific projects costs plus and a review of the overall expenditure required to meet load growth (called the capacity adjustment).

A8.3.2 DATA USED IN THE ANALYSIS

Regional factors have not been used in pipeline projects as we believe these projects are procured from nationally (rather than regionally) based contractors and hence are not expected to have a key regional pricing difference.

The expenditure analysis for LTS Capex has been used to split the Net Capex into the four components of Contractors, Direct/Overheads, Materials and Other.

Direct	Contract	Materials	Other
0%	60%	30%	10%

Table 8A - 11

From this breakdown adjustments have been made to remove the RPEs assumed by NGN.

For selected pipeline projects a standard unit cost for construction has been used to benchmark the costs (see appendix 6). These unit costs are shown below:

Pipeline diameter (mm)	PB Power projection (£m/km)
200.0	0.35
300.0	0.45
450.0	0.7
600.0	0.8
900.0	1.0
1050.0	1.05
1200.0	1.2

Table 8A - 12

At the end of the analysis process PB Power's assumptions for RPEs have then been applied to reach our final proposals.

A8.4 CONNECTIONS

A8.4.1 ANALYSIS USED

Analysis for Connections has been carried out for the total work activities. The base year for Connections was 2006/07.

A8.4.2 DATA USED IN THE ANALYSIS

Please refer to the worked example in section A1.1 for details of the Connections tables and values for the separate analysis.

A8.4.3 REGRESSION TABLE

The Total complete Connections regression table is given below:

GDN	2006/07	
	ln(Volume)	ln(Cost)
EoE	3.00	3.24
Lon	2.48	2.85
No	2.88	3.05
NW	2.34	2.72
Sc	3.15	3.20
So	3.20	3.30
WM	2.06	2.39
WW	2.99	3.11

Table 8A - 13

All of the analysis for Connections has been carried out on gross expenditure. Once the gross proposal has been calculated the amount of proposed income for the activities needs to be calculated. These percentages have been reached following an assessment of all of the returns made by the GDNs to reach a single assumption for all networks.

Domestic Load Connection Allowance (DLCA) Percentage of Gross Services Costs				Employer Ordered Works (EOW) Percentage of Gross Connections costs (Services, Mains & Governors)		
Existing Housing	New Housing	Non Domestic	Existing Housing MOB[10]	Existing Housing	New Housing	Non Domestic
58%	5%	0%	0%	6%	6%	6%

Table 8A - 14

A8.5 REINFORCEMENT MAINS

A8.5.1 ANALYSIS USED

Regression analysis has been used for Reinforcement Mains. The regression as been carried out for all pipe sizes with workload volumes being adjusted into a weighted average based on standard unit costs. The base year for Reinforcement Mains is 2005/06.

A8.5.2 DATA USED IN THE ANALYSIS

The expenditure analysis for Reinforcement Mains Capex has been used to split the Net Capex into the four components of Contractors, Direct/Overheads, Materials and Other.

Direct	Contract	Materials	Other
0%	64%	36%	0%

Table 8A - 15

A8.5.3 WORK DRIVER

The workload is weighted by a standard monetary value for each activity. These unit costs have been derived from an average of the unit costs as supplied by all GDNs.

Activity	Unit Value	Units
Total above 180mm	254	£/m
Total up to 180mm	124	£/m

Table 8A - 16

[10] MOB – Multiple Occupancy Buildings

A8.5.4 REGRESSION TABLE

The reinforcement regression table is given below:

GDN	2005/06	
	ln(Volume)	ln(Cost)
EoE	0.47	0.24
Lon	-0.41	-0.30
No	0.93	0.99
NW	-0.62	-0.69
Sc	1.02	0.90
So	1.23	1.25
WM	-1.83	-1.99
WW	1.64	1.72

Table 8A - 17

Due to the workload drivers and costs in £ million sometimes being less that one, the natural logs for these value are negative.

A8.6 GOVERNORS

A8.6.1 ANALYSIS USED

Regression analysis was not deemed appropriate for this activity. GDN proposals have been reviewed for RPEs, workload and unit costs.

A8.6.2 DATA USED IN THE ANALYSIS

The expenditure analysis for Governors Capex has been used to split the Net Capex into the four components of Contractors, Direct/Overheads, Materials and Other.

Direct	Contract	Materials	Other
5%	35%	60%	0%

Table 8A - 18

A8.7 OTHER OPERATIONAL CAPEX

A8.7.1 ANALYSIS USED

Regression analysis was not deemed appropriate for this activity. As this category contained a wide range of activities and not all these activities were used by every GDN, they were treated as a basket of costs which could be reprioritised by the GDN according to workload and operational needs.

9.4.5 DATA USED IN THE ANALYSIS

The expenditure analysis for Other Operational Capex has been used to split the Net Capex into the four components of Contractors, Direct/Overheads, Materials and Other. The split has been done for the purpose of calculation of RPE effects.

Direct	Contract	Materials	Other
5%	35%	60%	0%

Table 8A - 19

A8.8 NON OPERATIONAL CAPEX

A8.8.1 ANALYSIS USED

Regression analysis has not been used. Most of the analysis carried out has been carried out at Project level.

A8.8.2 DATA USED IN THE ANALYSIS

Extracts from the BPQ sheets have been repeated in the data extract tables. These have been linked through to PB Powers proposals.

A8.9 REPEX MAINS & SERVICES

A8.9.1 ANALYSIS USED

Regression analysis has been used for selected Repex mains and services activities. Activities associated with multiple occupancy buildings have been excluded from this regression analysis. The base year for the regression was 2005/06.

A8.9.2 DATA USED IN THE ANALYSIS

The expenditure analysis for Mains and Services Repex has been used to split the Net Repex into the four components of Contractors, Direct/Overheads, Materials and Other.

Pipe Size/Service	Direct	Contract	Materials	Other
<=75mm	11%	75%	11%	3%
>125mm to 180mm	11%	70%	16%	3%
>180mm to 250mm	12%	63%	21%	4%
>250mm to 355mm	11%	58%	28%	3%
>355mm to 500mm	10%	47%	39%	3%
>500mm to 630mm	14%	43%	43%	0%
>630mm	14%	43%	43%	0%
>75mm to 125mm	11%	74%	12%	3%
Non-domestic service replacement	9%	91%	0%	0%
Other domestic services	1%	99%	0%	0%
Purge & relight after domestic service work	100%	0%	0%	0%
Relaid services associated with mains replacement	8%	78%	14%	0%
Relaid services not associated with mains replacement (bulk relays)	0%	100%	0%	0%
Reposition domestic meter - service relays	100%	0%	0%	0%
Service relay domestic meterwork	66%	0%	34%	0%
Service test & transfer to new or other main	6%	94%	0%	0%
Services relaid after escape	29%	50%	21%	0%

Table 8A - 20

The unit costs used to calculate the weighted average workload drivers in the Repex regression have been developed where possible from contract schedules. The costs used are listed below:

Activity	Unit Value	Units
<=75mm	43.36	£/m
>75mm to 125mm	50.00	£/m
>125mm to 180mm	75.17	£/m
>180mm to 250mm	120.10	£/m
>250mm to 355mm	147.60	£/m
>355mm to 500mm	211.20	£/m
>500mm to 630mm	254.35	£/m
>630mm	400.00	£/m
Purge & relight after domestic service work	0.010	£ 000s/Service
Service relay domestic meterwork	0.090	£ 000s/Service
Service test & transfer to new or other main	0.147	£ 000s/Service
Other domestic services	0.296	£ 000s/Service
Relaid services associated with mains replacement	0.296	£ 000s/Service
Relaid services not associated with mains replacement (bulk relays)	0.296	£ 000s/Service
Reposition domestic meter - service relays	1.185	£ 000s/Service
Services relaid after escape	0.296	£ 000s/Service
Non-domestic service replacement	0.900	£ 000s/Service

Table 8A - 21

A8.9.3 REGRESSION TABLE

The complete Repex regression table is given below:

	2005/06	
GDN	ln(Volume)	ln(Cost)
EoE	4.03	4.60
Lon	2.98	3.76
No	3.70	4.15
NW	3.73	4.36
Sc	3.13	3.80
So	3.91	4.59
WM	3.46	3.94
WW	3.45	4.00

Table 8A - 22

A8.10 LTS REPEX

A8.10.1 ANALYSIS USED

Rechargeable LTS Repex was not subject to this analysis as actual verifiable costs will be recovered. Non rechargeable projects were treated as for LTS Capex - Pipelines.